AD 740 990

ENCAPSULATION

A DDC BIBLIOGRAPHY

DDC-TAS-72-19-I

MAY 1972

DEFENSE DOCUMENTATION CENTER
DEFENSE SUPPLY AGENCY

UNCLASSIFIED

Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author)	2a. REPORT SECURITY CLASSIFICATION
DEFENSE DOCUMENTATION CENTER Cameron Station Alexandria, Virginia 22314	UNCLASSIFIED
	2b. GROUP

3. REPORT TITLE

ENCAPSULATION

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

Bibliography (October 1955 - September 1971)

5. AUTHOR(S) (First name, middle initial, last name)

6. REPORT DATE	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
May 1972	114	77

8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S)
b. PROJECT NO.	DDC-TAS-72-19-I
c.	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)
d.	AD- 740 990

10. DISTRIBUTION STATEMENT

Approved for public release; distribution unlimited

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY

13. ABSTRACT

Encapsulation used as a protective covering for electronic circuits, insulation from moisture and heat, and lacquer film and thin film coatings of capacitors, is the subject of this bibliography. References dealing with failures, cracks, and deterioration effects are amply represented.

Corporate Author-Monitoring Agency, Subject, Title, and Personal Author Indexes are included.

DD FORM 1 NOV 68 1473

UNCLASSIFIED

Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
*Bibliographies						
*Encapsulation						
Embedding Substances						
Transistors						
Manufacturing Methods						
Films						
Aerosols						
Lacquer Films						
Coatings						
Electronic Equipment						
Integrated Circuits						
Mica						
Microminiaturization(Electronics)						
Naval Equipment						
Packaged Circuits						
Packaging						
Dielectrics						

ENCAPSULATION

A DDC BIBLIOGRAPHY

DDC-TAS-72-19-I

October 1955 - September 1971

MAY 1972

DEFENSE DOCUMENTATION CENTER
DEFENSE SUPPLY AGENCY
CAMERON STATION
ALEXANDRIA, VIRGINIA 22314

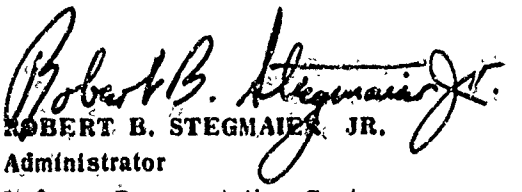
F O R E W O R D

This bibliography contains the pertinent (weighted) references in the DDC collection on *Encapsulation*. The time coverage is January 1953 to January 1972. In addition to the weighted references, it also contains selective citations related to the subject.

Corporate Author-Monitoring Agency, Subject, Title, and Personal Author Indexes are included.

BY ORDER OF THE DIRECTOR, DEFENSE SUPPLY AGENCY

OFFICIAL



ROBERT B. STEGMAIER, JR.
Administrator
Defense Documentation Center

C O N T E N T S

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD- 96 112
ARMY ELECTRONICS LABS FORT MONMOUTH N J

ENCAPSULATING RESINS AND POTTING COMPOUNDS (U)

OCT 55 V LINDEN,ERIK G.;
REPT. NO. ER E 1101

UNCLASSIFIED REPORT

DESCRIPTORS: •EMBEDDING SUBSTANCES, •PLASTICS, ENCAPSULATION (M)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-251 485
GENERAL ELECTRIC CO UTICA N Y

RESEARCH AND DEVELOPMENT OF THERMOCOUPLE ENERGY CONVERTERS (U)

DESCRIPTIVE NOTE: MONTHLY PROGRESS REPT. NO. 4, 29 DEC 60-28 JAN 61
AUG 60 9P
CONTRACT: DA-18-108-405-CML-941; DA-18-108-CML-6561

UNCLASSIFIED REPORT

DESCRIPTORS: •ENCAPSULATION, •THERMOCOUPLES, DESIGN, LEAD COMPOUNDS, PRODUCTION, TELLURIDES, THEORY (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-255 010
STANFORD RESEARCH INST MENLO PARK CALIF

ENCAPSULATED AEROSOLS (U)

IV ROBBINS,ROBERT C.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AEROSOLS, *CHEMICAL WARFARE AGENTS, *COATINGS, *ENCAPSULATION, AMMONIUM COMPOUNDS, BENZENEBORONIC ACID, CHLORIDES, COAGULATION, CONDENSATION, DIOXIDES, ELECTROSTATICS, ETHYLENES, FILMS, LIQUIDS, NITROGEN COMPOUNDS, PHOSPHATES, PHOSPHITES, PHOSPHORIC ACIDS, PHTHALATES, POLYMERIZATION, POLYMERS, SOLIDS, VAPORS (U)

VARIOUS METHODS OF AEROSOL ENCAPSULATION WERE STUDIED: (1) LIQUID PHASE MICROENCAPSULATION, (2) CONDENSATION, AND (3) COAGULATION. AEROSOL ENCAPSULATION BY CONDENSATION, USING THE CORE PARTICLES OR DROPLETS AS CONDENSATION NUCLEI, PROVED TO BE A GENERALLY SUCCESSFUL TECHNIQUE. COAGULATION WITH INERTIAL FORCES, USING SIMPLE LOW-POWERED DEVICES, SHOWED LITTLE PROMISE AS A PRACTICAL AEROSOL ENCAPSULATION METHOD. COAGULATION WITH ELECTROSTATIC CHARGING OF THE PARTICLES WAS ONLY PARTIALLY SUCCESSFUL IN SOLID ON LIQUID AND LIQUID ON LIQUID SYSTEMS, BUT WORKED QUITE WELL IN ENCAPSULATING SOLID CORES WITH LIQUID FILMS. LIQUID PHASE MICROENCAPSULATION WAS QUITE SUCCESSFUL, WHERE APPLICABLE. A NUMBER OF LIQUID CORES WERE SUCCESSFULLY POLYERSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-255 962
NAVAL ORDNANCE TEST STATION CHINA LAKE CALIF

EFFECT OF PROCESS VARIABLES ON THE DIMENSIONS AND QUALITY OF EXTRUSION-COATED PROPELLANT GRAINS (U)

DEC 60 IV METCALF,H.F.;SUTHERLAND,RODNEY;
REPT. NO. TP 2997
MONITOR: NAVWEPS 7604

UNCLASSIFIED REPORT

DESCRIPTORS: •COATINGS, •ENCAPSULATION, •EXTRUSION, •PLASTIC COATINGS, •PROPELLANT GRAINS, CELLULOSE, ETHYL CELLULOSE, MACHINE TOOLS, MANUFACTURING METHODS, PROCESSING, QUALITY CONTROL, SOLID ROCKET PROPELLANTS(U)

THE SECOND PHASE OF AN EXPERIMENT TO EVALUATE AN EXTRUSION-COATING PROCESS FOR INHIBITING ROCKETPROPELLANT GRAINS WITH ETHYLCELLULOSE IS DESCRIBED. THE OBJECTIVES OF THIS PHASE OF THE EXPERIMENT ARE TO APPLY A SET OF CHOSEN OPERATING CONDITIONS IN THE 2 1/2-INCH EXTRUDER AND TO CONSIDER THE EFFECT OF EIGHT ADDITIONAL PROCESS FACTORS ON THE QUALITY AND DIMENSIONS OF THE INHIBITED PROPELLANT GRAINS. DATA RESULTING FROM THESE APPLICATIONS ARE PRESENTED IN TABULAR AND GRAPHICAL FORM, AND AN INTERPRETATION OF THE DATA IS INCLUDED IN THE TEXT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-257 829
WESTERN ELECTRIC CO INC WINSTON-SALEM N C

INDUSTRIAL PREPAREDNESS STUDY. LACQUER FILM CAPACITORS (U)

MAY 61 YV LLOYD,H.E.;
CONTRACT: DA36 039SC81268

UNCLASSIFIED REPORT

DESCRIPTORS: *CAPACITORS, ALUMINUM COATINGS, CELLULOSE ACETATES, COATINGS, DIELECTRIC FILMS, ELECTRIC INSULATION, ENCAPSULATION, FILMS, MANUFACTURING METHODS, METAL COATINGS, PAPER, PLASTIC COATINGS, PRODUCTION, QUALITY CONTROL, RESISTANCE (ELECTRICAL), TESTS, THIN FILMS (STORAGE DEVICES), VARNISHES (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (M)

EFFORT HAS BEEN DIRECTED PRIMARILY TOWARD IMPROVEMENTS IN THE QUALITY OF THE LACQUER FILM CAPACITORS. DIFFICULTIES EXPERIENCED WITH DETERIORATION OF INSULATION RESISTANCE AND EFFECTIVE SERIES RESISTANCE UPON THE APPLICATION OF HEAT HAVE BEEN RESOLVED. ALSO, EXCESSIVE CAPACITANCE GROWTH HAS BEEN BROUGHT UNDER CONTROL. DATA WERE PRESENTED TO SHOW THE PRESENT LEVEL OF QUALITY. ALSO, PREVIOUSLY COLLECTED DATA IS USED TO MAKE COMPARISONS WIT THE CURRENT EXPERIENCE. PREPRODUCTION SAMPLES FOR THE 1.0 AND 0.1 MICROFARAD SIZES ARE UNDERGOING ELECTRICAL TEST. SAMPLES FOR THE 5.6 MICROFARAD SIZE ARE IN AN ADVANCED STAGE OF PRODUCTION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-258 395
SYNTHETIC MICA CO WEST CALDWELL N J

DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS (U)

NOV 60 IV BARR,F.A.;MCCARTHY,J.P.;
CONTRACT: NOBS78714

UNCLASSIFIED REPORT

DESCRIPTORS: •EMBEDDING SUBSTANCES, •ENCAPSULATION, •MICA, ALUMINUM COMPOUNDS, BINDERS, COATINGS, DIELECTRICS, ELECTRICAL PROPERTIES, ELECTRONIC EQUIPMENT, GLASS, HIGH-TEMPERATURE RESEARCH, MATERIALS, PHOSPHATES, PHYSICAL PROPERTIES, POROSITY (U)

INCREASING THE CONCENTRATION OF AQUEOUS ALUMINUM PHOSPHATE DECREASED THE POROSITY OF PHOSPHATEBONDED SYNTHETIC MICA COMPOUND. POROSITY CAN BE DECREASED BY GLASS COATINGS BUT THE THERMAL EXPANSION OF THE GLASS MUST MATCH THAT OF THE SAMPLE. A VOLUME SHRINKAGE OF APPROXIMATELY 7% WAS CALCULATED FOR A STANDARD PHOSPHATE-BONDED SYNTHETIC MICA COMPOUND. INITIAL RESULTS OF ELECTRICAL PROPERTIES AT ELEVATED TEMPERATURES INDICATE THAT THE PHOSPHATE-BONDED SYNTHETIC MICA SYSTEMS ARE SUITABLE FOR 500 C USE. COMMERCIAL ELECTRONIC COMPONENTS (MAGNETIC AMPLIFIERS, CAPACITORS, AND SMALL MOTORS) WERE SUCCESSFULLY POTTED AND ENCAPSULATED WITH THE BONDED SYNTHETIC MICA COMPOUND. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-260 926
STANFORD RESEARCH INST MENLO PARK CALIF

ENCAPSULATED AEROSOLS (U)

IV ROBBINS, ROBERT C.;

UNCLASSIFIED REPORT

DESCRIPTORS: •AEROSOLS, •ENCAPSULATION, ACETAES, ACRYLIC RESINS, BUTYL RADICALS, CHEMICAL WARFARE AGENTS, COATINGS, CONDENSATION, CONTAINERS, ETHYLENES, FILMS, LIQUIDS, NITROCELLULOSE, PHOSPHITES, POLYMERIZATION, POLYMERS, RUBBER, VAPORS, VINYL RADICAL (U)

CONDENSATION POLYMERIZATION OF A NUMBER OF VAPOR PHASE MONOMERS, AS A MEANS OF ENCAPSULATING AEROSOL DROPLETS, WAS STUDIED. THE BEST OF THESE, VINYL ACETATE, POLYMERIZED RAPIDLY AND PRODUCED SOME POLYMER FILM ENCAPSULATION OF THE AEROSOL DROPLETS. A TWO-STAGE MICROCAPSULE GENERATOR WAS DESIGNED, FABRICATED, AND OPERATED. DIBUTYL PHOSPHITE DROPLETS OF ABOUT 5-MICRON DIAMETER WERE ENCAPSULATED WITH A LIQUID GLYCERINE FILM. BY USING SOLUTIONS OF ENCAPSULATING MATERIAL, THE GENERATOR ALSO PRODUCED MICROCAPSULES OF DIBUTYL PHOSPHITE IN POLYETHYLENE, NITROCELLULOSE, AND NATURAL RUBBER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-261 938
BELL TELEPHONE LABS INC WHIPPANY N J

ENGINEERING SERVICES ON TRANSISTORS (U)

MAY 61 1V ATALLA,M.M.;DODSON,G.A.;
CONTRACT: DA36 039SC85352

UNCLASSIFIED REPORT

DESCRIPTORS: *DIODES, *TRANSISTOR AMPLIFIERS, *TRANSISTORS, AGING (PHYSIOLOGY), DESIGN, ELECTRICAL PROPERTIES, ENCAPSULATION, FAILURE (MECHANICS), GERMANIUM, IMPURITIES, MEASUREMENT, MICROWAVE EQUIPMENT, RELIABILITY, SILICON, STORAGE, STRESSES, SWITCHING CIRCUITS, TEMPERATURE, TEST METHODS, TESTS (U)

STUDIES AND INVESTIGATIONS WERE CONTINUED ON TRANSISTORS AND TRANSISTOR-LIKE DEVICES WITH A VIEW TOWARD DEMONSTRATING AND INCREASING THE PRACTICABILITY OF THEIR USE IN OPERATING EQUIPMENT. STATUS REPORTS ARE PRESENTED ON: (1) ACCELERATED STEP-STRESS AGING OF DIODES, (2) A 3000-Mc MICROWAVE GERMANIUM TRANSISTOR, (3) A 1-WATT, 1000 MC GERMANIUM TRANSISTOR, (4) INTEGRATED CIRCUIT DEVELOPMENT, (5) TRANSISTOR REQUIREMENTS FOR DCTL, AND (6) AN ANALYSIS OF STORAGE TIME BEHAVIOR OF DIFFUSED EPITAXIAL SILICON TRANSISTORS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 314
STANFORD RESEARCH INST MENLO PARK CALIF

ENCAPSULATED AEROSOLS (U)

IV ROBBINS, ROBERT C.;

UNCLASSIFIED REPORT

DESCRIPTORS: •AEROSOLS, •ENCAPSULATION, AEROSOL GENERATORS, BUTYL RADICALS, CHEMICAL WARFARE AGENTS, COATINGS, DESIGN, DROPS, EFFECTIVENESS, ETHYLENES, LIQUIDS, PHOSPHITES, POLYMERS, RUBBER, WAXES (U)

A TWO-STAGE MICROCAPSULE GENERATOR HAS BEEN UTILIZED TO PRODUCE A VARIETY OF LIQUID CORE MICROCAPSULES. A NUMBER OF OPERATIONAL AND DESIGN CHANGES HAVE BEEN MADE TO IMPROVE THE PERFORMANCE OF THE GENERATOR AND TO INCREASE ITS VERSATILITY. THE GENERATOR HAS BEEN USED TO PROVIDE MICROCAPSULES OF DIBUTYL PHOSPHITE IN RUBBER, DIBUTYL PHOSPHITE IN PARAFFIN, AND DIBUTYL PHOSPHITE IN POLYETHYLENE. STUDIES WERE MADE OF THE EFFECT OF FILM COATING ON THE EVAPORATION RATE OF DIBUTYL PHOSPHITE MICRODROPLETS. AN INVESTIGATION WAS MADE OF THE EFFECT OF SOLUTION CONCENTRATION ON COAT THICKNESS IN SPRAYDRIED MICROCAPSULES. NOZZLE DESIGN WAS FOUND TO BE A CRITICAL PARAMETER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 461
GENERAL ELECTRIC CO SYRACUSE N Y

OPTIMIZATION OF THERMOELECTRIC ENERGY CONVERTERS (U)

DEC 60 IV KLEIN,PHILIPP H.;
CONTRACT: NOBS78403

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *GENERATORS, *THERMAL CONDUCTIVITY, *THERMOELECTRICITY, ANTIMONY ALLOYS, BISMUTH ALLOYS, CALCIUM COMPOUNDS, CHROMIUM COMPOUNDS, ENCAPSULATION, HEAT TRANSFER, INTERMETALLIC COMPOUNDS, LEAD COMPOUNDS, MAGNESIUM COMPOUNDS, MATERIALS, SILICATES, TANTALUM, TELLURIDES, THERMAL INSULATION (U)

DESCRIPTORS: *THERMOELECTRICITY, *GENERATORS, *THERMAL CONDUCTIVITY, ENCAPSULATION, LEAD COMPOUNDSC COMPOUNDS, BISMUTH ALLOYS. CONSIDERATION OF THERMAL SYSTEM NO. 1 WAS CONTINUED. THE SOURCE OF HEAT FOR THIS SYSTEM IS SATURATED STEAM AT 533 K (500 F), AND THE HEAT SINK IS SEA WATER AT 291 K (65 F). RESULTS FOR FORCED-CONVECTION COOLING HAVE BEEN COMPARED WITH THOSE FOR FREE-CONVECTION COOLING. IN ADDITION, THE POSSIBLE IMPROVEMENTS IN PERFORMANCE THAT MAY RESULT FROM USE OF BETTER THERMOELECTRIC MATERIALS THAN ARE CURRENTLY AVAILABLE HAVE BEEN COMPUTED. THESE RESULTS WERE OBTAINED WITH THE AID OF A COMPUTER PROGRAM DESIGNATED NOBS-2. PROGRESS WAS ALSO MADE IN THE PREPARATION OF COMPUTER PROGRAM NOBS-3, WHICH PROVIDES A MORE ACCURATE REPRESENTATION OF THE LOSSES IN ELECTRICAL CONDUCTORS, ELECTRICAL CONTACTS, AND THERMAL SHUNTS THAN IS POSSIBLE WITH THE NOBS-2 PROGRAM. IN ADDITION, GENERAL CHARACTERISTICS HAVE BEEN EVOLVED FOR THE NEXT THERMAL SYSTEM TO BE ANALYZED. (AUTHOR) (U)

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 499
SYNTHETIC MICA CO WEST CALDWELL N J

DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS (U)

MAY 61 1V BARR,F.A.;MCCARTHY,J.P.;
CONTRACT: NOBS78714

UNCLASSIFIED REPORT

DESCRIPTORS: •DIELECTRICS, •ELECTRONIC EQUIPMENT, •EMBEDDING SUBSTANCES, •ENCAPSULATION, •MICA, ADHESIVES, ALUMINATES, ALUMINUM COMPOUNDS, BINDERS, BORON COMPOUNDS, COATINGS, DIELECTRIC PROPERTIES, GLASS, GYPSUM, HIGH-TEMPERATURE RESEARCH, MEASUREMENT, MECHANICAL PROPERTIES, PARTICLES, PHOSPHATES, PHYSICAL PROPERTIES, POROSITY, THERMAL EXPANSION, THERMODYNAMICS (U)

PHOSPHATE SYNTHETIC MICA WAS INVESTIGATED AS A DIELECTRIC MATERIAL FOR ENCAPSULATING AND EMBEDDING ELECTRONIC COMPONENTS FOR 500 C USE. PHYSICAL PROPERTIES OF THE SYSTEM WERE DETERMINED AND FOUND TO BE SUITABLE FOR HIGH TEMPERATURE USE. VARIOUS METHODS OF REDUCING POROSITY WERE INVESTIGATED INCLUDING DRY PRESSING, GLASS COATING, ADDITIVES AND VARIOUS PHOSPHATE BONDS. THE USE OF A DEVITRIFIED GLASS SEALING CEMENT AS A COATING FOR THE PHOSPHATE SYNTHETIC MICA RESULTED IN A COMPOSITE MATERIAL CURED BELOW 500 C, HAVING GOOD PHYSICAL PROPERTIES WITH WATER ABSORPTION LESS THAN 1%. COMMERICAL CAPACITORS, TRANSFORMERS, AND MOTORS WERE ENCAPSULATED AND TESTED. PROTOTYPE HIGH TEMPERATURE RESISTORS WERE CONSTRUCTED AND ENCAPSULATED FOR 500 C APPLICATIONS USING CERAMO-PLASTIC INJECTION MOLDING TECHNIQUES IN COMBINATION WITH THE PHOSPHATE-MICA DIELECTRIC MATERIAL. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 857
GENERAL ELECTRIC CO SYRACUSE N Y

OPTIMIZATION OF THERMOELECTRIC ENERGY CONVERTERS (U)

FEB 61 IV LUFT,L.;
CONTRACT: NOBS78403

UNCLASSIFIED REPORT

DESCRIPTORS: •ELECTRIC POWER PRODUCTION, •POWER SUPPLIES, •THERMOELECTRICITY, ANTIMONY ALLOYS, ARSENIDES, BISMUTH ALLOYS, CALCIUM COMPOUNDS, CERAMIC MATERIALS, CHEMICAL PROPERTIES, CHROMIUM COMPOUNDS, CRYSTAL STRUCTURE, DESIGN, ELECTRICAL PROPERTIES, ENCAPSULATION, GENERATORS, HALL EFFECT, HEAT, HEAT TRANSFER, INTERMETALLIC COMPOUNDS, LEAD COMPOUNDS, MAGNESIUM COMPOUNDS, MEASUREMENT, MECHANICAL PROPERTIES, OXIDES, SELENIDES, SOURCES, TANTALUM, TELLURIDES, TESTS (U)

THE WORK ON A SELECTED SYSTEM, DESIGNATED THERMAL SYSTEM NO. 1, WAS COMPLETED USING A COMPUTER PROGRAM. THERMAL SYSTEM NO. 1 IS BASED ON SATURATED STEAM AT 533 K AS THE HEAT SOURCE AND 291 K WATER AS THE HEAT SINK. MGO-TIO2 CERAMIC WAS MADE INTO CAP ULE BODIES AND USED FOR SUCCESSFUL ENCAPSULATION OF LEAD TELLURIDE. SEEBECK COEFFICIENT OF MG3SB2 WAS MEASURED IN THE 300 TO 1250 K TEMPERATURE RANGE, THE VALUES RANGING FROM 100 TO 159 MICROVOLTS PER DEGREES K. ELECTRICAL MEASUREMENTS WERE PERFORMED ON CRSBO.9SEO.1, INCLUDING SEEBECK COEFFICIENT AND ELECTRICAL RESISTANCE. A NUMBER OF II-IV COMPOUNDS WAS PREPARED AND THEIR THERMOELECTRIC PROPERTIES MEASURED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 866
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

ENCAPSULATING, POTTING, AND EMBEDDING MATERIALS FOR ELECTRONIC COMPONENTS AND MODULES. AN ANNOTATED BIBLIOGRAPHY (U)

AUG 61 1V OWENS, GEORGE E.;
REPT. NO. SB 61 50
CONTRACT: AF04 647 787

UNCLASSIFIED REPORT

DESCRIPTORS: •BIBLIOGRAPHIES, •EMBEDDING SUBSTANCES, •ENCAPSULATION, •INSULATING MATERIALS, ELECTRIC INSULATION, ELECTRONIC EQUIPMENT (U)

THIS BIBLIOGRAPHY RESULTS FROM A SEARCH FOR INFORMATION ON MATERIALS USED FOR ENCAPSULATING, POTTING, AND EMBEDDING ELECTRONIC COMPONENTS. THERE ARE 97 REFERENCES, ARRANGED BY TITLE, WITH PUBLICATION DATES BETWEEN JANUARY 1958 AND AUGUST 1961. FOLLOWING THE REFERENCES ARE INDEXES OF AUTHORS AND SPONSORS, JOURNAL SOURCES, AND REPORT NUMBERS. THE FOLLOWING SOURCES WERE CONSULTED DURING THE SEARCH: LMSC TECHNICAL INFORMATION CENTER CARD CATALOGS, APPLIED SCIENCE AND TECHNOLOGY INDEX, 1958-1961, ASTIA TECHNICAL ABSTRACT BULLETIN, 1958-1961, ELECTRICAL ENGINEERING ABSTRACTS, 1958-1961, ENGINEERING INDEX, 1958-1961, U.S. GOVERNMENT RESEARCH REPORTS, 1960-1961, AND PERTINENT JOURNALS, 1961. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 894
NATIONAL CASH REGISTER CO DAYTON OHIO

A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID ROCKET FUEL (U)

JUN 61 IV HSIEH,PAUL Y.;
CONTRACT: NONR284800

UNCLASSIFIED REPORT

DESCRIPTORS: *AMIDES, *DROPS, *ENCAPSULATION, *FILMS, *HYDRAZINES, *LIQUID ROCKET PROPELLANTS, *METHYL HYDRAZINES, COATINGS, COPOLYMERIZATION, ETHYLENES, GELS, LIQUIDS, MEMBRANES, ORGANIC COMPOUNDS, PHYSICAL PROPERTIES, POLYMERIZATION, POLYMERS, PRODUCTION, ROCKET FUELS, ROCKET OXIDIZERS (U)

THE PHENOMENA INVOLVED IN ENCAPSULATION FROM NONAQUEOUS MEDIA IS DISCUSSED. STUDIES INCLUDED: (1) ESTABLISHMENT OF THE ESSENTIAL CONDITIONS FOR THE ACCUMULATION OF MACROMOLECULES AROUNDA DISPERSED LIQUID DROPLET TO BE ENCAPSULATED (INTERNAL PHASE), (2) ENCAPSULATION OF LIQUIDS BY INTERFACIAL POLYMERIZATION APPROACH, AND (3) TESTING OF THE COMPATIBILITY OF ETHYLENE DIAMINE, 1,1-DIMETHYL HYDRAZINE, AND HYDRAZINE WITH VARIOUS SOLVENTS. AMINES, ESPECIALLY ETHYLENE DIAMINE, WERE SELECTED AS MODEL COMPOUNDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 895
NATIONAL CASH REGISTER CO DAYTON OHIO

A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID ROCKET FUE. (U)

JAN 61 IV HSIEH,PAUL Y.;
CONTRACT: NONR284800

UNCLASSIFIED REPORT

DESCRIPTORS: *ENCAPSULATION, *ETHYL CELLULOSE, *FILMS, *GASES, *NITROCELLULOSE, *POLYMERS, *SEMIPERMEABILITY, *VAPORS, AMMONIA, ARGON, CARBON DIOXIDE, COATINGS, DIFFUSION, DIPOLE ANTENNAS, HELIUM, LIQUID ROCKET PROPELLANTS, MEMBRANES, NITROGEN, OXYGEN, PLASTIC COATINGS, ROCKET FUELS, SOLUBILITY, SULFUR COMPOUNDS, WATER VAPOR (U)

PERMEABILITY OF ETHYLCELLULOSE AND NITROCELLULOSE FILMS TO 13 DIFFERENT GASES AND VAPORS WAS DETERMINED. THE SOLUBILITY OF THESE GASES AND VAPORS IN ETHYLCELLULOSE AND NITROCELLULOSE WAS ALSO MEASURED Y GRAVIMETRIC AND VOLUMETRIC METHODS OF EQUILIBRIUM SORPTION. FROM THESE DATA FOR PERMEABILITY AND SOLUBILITY, DIFFUSION CONSTANTS OF THE GASES AND VAPORS IN THE POLYMERIC FILMS WERE CALCULATED BY MEANS OF THE RELATION, P EQUALS DS. IT WAS FOUND THAT THE DIFFUSION CONSTANT DECREASED LINEARLY WITH AN INCREASE OF MOLECULAR WEIGHT; HOWEVER, THE SHAPE FACTOR OF THE MOLECULES PLAYED AN IMPORTANT ROLE IN DIFFUSION. THE SOLUBILITY CONSYANTS DECREASED LINEARLY WITH AN INCREASE OF THE LENNARD-JONES FORCE CONSTANTS WHEN SOLUBILITY WAS EXPRESSED ON , 94P. INCL. IL WEIGHT BASIS RATHER THAN A VOLUME BASIS. IT IS POSSIBLE TO ESTIMATE PERMEABILITIES OF OTHER GASES AND VAPORS IN THESE FILMS FROM THEIR MOLECULAR WEIGHTS AND LENNARD-JONES FORCE CONSTANTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-266 161
SYNTHETIC MICA CO WEST CALDWELL N J

DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS (U)

FEB 61 IV BARR,F.A.;MCCARTHY,J.P.;
CONTRACT: NOBS7(714

UNCLASSIFIED REPORT

DESCRIPTORS: •EMBEDDING SUBSTANCES, •ENCAPSULATION, •MICA, ALUMINUM COMPOUNDS, BINDERS, BORATES, CASTING, DIELECTRIC PROPERTIES, DIELECTRICS, ELECTRICAL PROPERTIES, ELECTRONIC EQUIPMENT, GLASS, LEAD COMPOUNDS, MOLDING MATERIALS, PHOSPHATES, PHYSICAL PROPERTIES, POROSITY, PRESSURE, PROCESSING, SILICONES, SYNTHETIC RUBBER (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-274 642
DEPUTY COMMANDER AEROSPACE SYSTEMS INGLEWOOD CALIF

CRYSTAL GROWTH AND CRYSTALLOGRAPHY. A LITERATURE SURVEY (U)

JAN 62 IV CHERON,THEODORE;
REPT. NO. TDR62 5
CONTRACT: AF04 647 930
MONITOR: DCAS TDR62 5

UNCLASSIFIED REPORT

DESCRIPTORS: •BIBLIOGRAPHIES, •CORUNDUM, •CRYSTALS, •GARNET, •RUBY, •SPINELS, ALUMINUM COMPOUNDS, CRYSTAL STRUCTURE, FERRITES, GROWTH, LASERS, METALLIC COMPOUNDS, OXIDES, PREPARATION, REFRACTORY MATERIALS, SAPPHIRES, SPECTROGRAPHIC ANALYSIS (U)

THIS BIBLIOGRAPHY, CONSISTING OF 163 ENTRIES, COVERS THE PERIOD FROM 1950 TO 1961. IT REVIEWS THE LITERATURE ON THE PREPARATION OF CRYSTALS FOR LASERS, COVERING MAGNETIC AND NON-MAGNETIC GARNETS, RUBIES, CRYSTALLOGRAPHY, AND HIGH-MELTING METAL OXIDES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-283 325
STANFORD RESEARCH INST MENLO PARK CALIF

ENCAPSULATED AEROSOLS (U)

APR 62 1V ROBBINS,ROBERT C.;

UNCLASSIFIED REPORT

DESCRIPTORS: •AEROSOLS, •COATINGS, •ENCAPSULATION, AMMONIUM COMPOUNDS, BENZOIC ACIDS, CHEMICAL WARFARE AGENTS, CHLORIDES, COAGULATION, CONDENSATION, DIOXIDES, ELECTROSTATICS, ETHYLENES, FILMS, LIQUIDS, NITROGEN COMPOUNDS, PHOSPHATES, PHOSPHITES, PHOSPHORIC ACIDS, PHTHALATES, POLYMERIZATION, POLYMERS, SOLIDS, VAPORS (U)

METHODS OF AEROSOL ENCAPSULATION INCLUDED: PREENCAPSULATION, COLLECTION, THEN REDISPERSION; ENCAPSULATION BY CONDENSATION FROM A SUPERSATURATED VAPOR, OR BY CONDENSATION INVOLVING CATALYTIC POLYMERIZATION; AND VARIOUS COAGULATION METHODS. THE PHYSICAL AND CHEMICAL PROPERTIES OF THE CORE AND COAT MATERIALS DETERMINE THE RANGE OF APPLICABILITY OF EACH METHOD. A USEFUL MICROENCAPSULATION METHOD, BASED ON COAGULATION BY INERTIAL FORCE WAS DEVELOPED. THE GENERATION APPARATUS, CONSISTING OF TWO AEROSOL GENERATORS IN SERIES, WAS UTILIZED TO PRODUCE MANY KINDS OF MICROCAPSULES. A FLUID ENERGY MILL WAS FOUND USEFUL FOR THE PRODUCTION OF SOME MICROCAPSULES. THE PERMEABILITY OF MICROCAPSULE FILMS AND THE EFFECT OF EXPOSURE TIME AND HUMIDITY WERE STUDIED USING DIBUTYL PHOSPHITE CORES. PHYSICAL PROPERTIES OF MICROCAPSULE CORE AND COAT MATERIALS BELIEVED TO BE IMPORTANT IN ENCAPSULATION WERE MEASURED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-284 0,5
SOUTHWEST RESEARCH INST SAN ANTONIO TEX

ENCAPSULATION OF FOODS (U)

IV SCHUETZE,CLARKE E.;MCMAHON,WILLIAM E.;
REPT. NO. TDR62 53
CONTRACT: AF33 616 7717
MONITOR: 6570 AMRL TDR62 53

UNCLASSIFIED REPORT

DESCRIPTORS: •CONTAINERS, •ENCAPSULATION, •FOOD, COATINGS, PRESERVATION, PROCESSING, SPACE FLIGHT (U)

BARRIER MATERIALS MEETING FOOD AND DRUG ADMINISTRATION STANDARDS WERE STUDIED FOR USE IN THE ENCAPSULATION OF FOODS, AND FOR THE PREPARATION OF SAMPLE CAPSULES OF FOOD ITEMS FOR EVALUATION. THE ENCAPSULATING MATERIAL MUST BE CAULE CONTENTS UNDER AMBIENT CONDITIONS AND ALSO IN HIGH TEMPERATURE AND HIGH VACUUM ENVIRONMENTS. THE FOOD IN THE CAPSULES MUST REMAIN UNCONTAMINATED AND HIGHLY STABLE FOR SIX MONTHS WITHOUT REFRIGERATION. FOOD' OF LOW MOISTURE CONTENT WERE ENCAPSULATED IN TWO STEPS, USING A SOFT-SHELLED CAPSULE WITH AN OVERWRAP. FUDGE, POUND CAKE, AND BROWNIES WERE FIRST PLACED IN PREFORMED CONTAINERS; CARAMELS AND PECANS WERE FIRST SPRAY CABLE OF MAINTAINING ITS ESSENTIAL PROPERTIES AND THOSE OF THE CAPSULE CONTENTS UNDER AMBIENT CONDITIONS AND ALSO IN HIGH TEMPERATURE AND HIGH VACUUM ENVIRONMENTS. THE FOOD IN THE CAPSULES MUST REMAIN UNCONTAMINATED AND HIGHLY STABLE FOR SIX MONTHS WITHOUT REFRIGERATION. FOODS OF LOW MOISTURE CONTENT WERE ENCAPSULATED IN TWO STEPS, USING A SOFT-SHELLED CAPSULE WITH AN OVERWRAP. FUDGE, POUND CAKE, AND BROWNIES WERE FIRST PLACED IN PREFORMED CONTAINERS; CARAMELS AND PECANS WERE FIRST SPRAY COATED. IN EACH CASE THE BITE-SIZED PORTIONS WERE HEAT-SEALED INTO PLASTIC BAGS. FOODS OF MODERATE MOISTURE CONTENT, EXEMPLIFIED BY MEAT, AND FOODS OF HIGH MOISTURE CONTENT, SUCH AS VEGETABLES AND FRUITS, WERE ENCAPSULATED IN LAMINATED CONTAINERS WITH AN OVERWRAP. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-286 907
PHILCO CORP LANSDALE PA

PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT (U)

JUL 62 IV SANDERS,J.;
REPT. NO. R 232 1
CONTRACT: DA36 039SC86720

UNCLASSIFIED REPORT

DESCRIPTORS: (•TRANSISTORS), (•MANUFACTURING METHODS), RELIABILITY, STRESSES, STORAGE, OPERATION, ENCAPSULATION, ELECTRODES, TEMPERATURE, SEALS(STOPPERS), DEGASIFICATION, CHEMICAL MILLING, HIGH-TEMPERATURE RESEARCH, PRODUCTION (M)

A PRODUCTION ENGINEERING MEASURE WAS STUDIED FOR IMPROVEMENT OF PRODUCTION TECHNIQUES TO INCREASE THE RELIABILITY FOR THE JET ETCH TRANSISTOR TYPE 2N501A, WITH A MAXIMUM OPERATING FAILURE RATE OF 0.01% PER 1000 HOURS AT A 90% CONFIDENCE LEVEL AT 25 C AS AN OBJECTIVE. EFFORTS WERE MADE TO IMPROVE THE FOLLOWING SEVEN MANUFACTURING PROCESSES: (1) PLATING EDGE DEFINITION, (2) HIGHER TEMPERATURE ALLOYS, (3) LEAD ATTACHMENTS (INCLUDES COLLECTOR ATTACHMENTS), (4) CONTROLLED FORMATION OF SURFACE OXIDES FOR SURFACE STABILIZATION, (5) GETTERING TECHNIQUES FOR ENCAPSULATING AND SEALING, (6) THERMAL DISSIPATION OF PACKAGE, AND (7) LEAK DETERMINATION. ESTABLISHMENT OF A PILOT LINE TO INCORPORATE THESE PROCESS IMPROVEMENTS IS REPORTED. PRELIMINARY OPERATING STRESS DATA O TRANSISTORS FABRIC TED ON THE PILOT LINE INDICATES AN IMPROVEMENT IN POWER HANDLING CAPABILITY AS A RESULT OF THE PROCESS IMPROVEMENTS COMPLETED. PROBLEMS ASSOCIATED WITH OPERATING STRESS TESTING AND WITH OBTAINING CORRELATION BETWEEN OPERATING STRESS TESTING AND STORAGE STRESS TESTING ARE DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-289 291
WESTINGHOUSE ELECTRIC CORP WASHINGTON D C

HIGH CURRENT AND HIGH VOLTAGE SILICON CONTROLLED RECTIFIERS (U)

OCT 62 IV
CONTRACT: NOBSR87646

UNCLASSIFIED REPORT

DESCRIPTORS: *POWER, *RECTIFIERS, ALUMINUM, ANTIMONY, BORON, COOLING, CRYSTALLIZATION, CRYSTALS, DIFFUSION, ELECTRIC CURRENTS, ELECTRIC POTENTIAL, ENCAPSULATION, GOLD ALLOYS, MOLYBDENUM, SILICON, SWITCHING CIRCUITS, TRANSIENTS (U)

DEVELOPMENT OF A HIGH CURRENT, HIGH VOLTAGE SILICON CONTROLLED RECTIFIER.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-294 110
TRW SEMICONDUCTORS INC LAWNDALE CALIF

PRODUCTION ENGINEERING MEASURE RELIABILITY THRU PROCESS IMPROVEMENT (U)

SEP 62 IV BARNES,S.H.;CHIEN,F.;

UNCLASSIFIED REPORT

DESCRIPTORS: *MANUFACTURING METHODS, *TRANSISTORS, DIFFUSION, ELECTRICAL PROPERTIES, ENCAPSULATION, EVAPORATION, FAILURE (MECHANICS), LIFE EXPECTANCY, PROCESSING, PRODUCTION, QUALITY CONTROL, RELIABILITY (U)

EFFORT IS PRESENTED ON THE PRODUCTION ENGINEERING MEASURE TO INCREASE TRANSISTOR RELIABILITY. PROCESS IMPROVEMENTS WITHIN THE MAJOR TASKS OF MATERIAL EVALUATION, DIFFUSION AND PHOTORESIST, CONTACT METALLIZING, LEAD ATTACHMENT, AND ENCAPSULATION WERE ACCOMPLISHED. EMPHASIS WAS PLACED ON THE METHOD OF CONTACT METALLIZING AND LEAD ATTACHMENT. SAMPLE QUANTITIES OF DEVICES UTILIZING AN EVAPORATED ALUMINUM LAYER FOR BASE AND EMITTER CONTACTS WERE PLACED ON LIFE TEST. EQUIPMENT WAS RECEIVED TO BEGIN ALUMINUM WIRE BONDING. FEASIBILITY TESTS TO DETERMINE STRESS LEVELS OF THE STEP-STRESS AGING WERE STARTED. RELIABILITY EVALUATION OF PRODUCTION DEVICES CONTINUED TO FURTHER SUBSTANTIATE THE FAILURE RATE BASIS FROM WHICH THE EFFECTS OF THE PROCESS IMPROVEMENT TASKS WILL BE MEASURED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-295 538
MCDONNELL AIRCRAFT CORP ST LOUIS MO

ELECTRICAL POTTING COMPOUNDS - SURFACE AND VOLUME RESISTIVITY AT ELEVATED TEMPERATURES FOR PROTRACTED TIMES (PHASE II: ELECTRICAL TESTS) (U)

JAN 63 80P
REPT. NO. 9354
CONTRACT: AF33 657 7749

UNCLASSIFIED REPORT

DESCRIPTORS: •ELECTRONIC EQUIPMENT, •EMBEDDING SUBSTANCES, •ENCAPSULATION, CONTAINERS, ELECTRIC CONNECTORS, ELECTRICAL PROPERTIES, PACKAGED CIRCUITS, PLASTICS, RESISTANCE (ELECTRICAL), TEMPERATURE, TESTS (U)

POTTING COMPOUNDS FOR ELECTRONIC CIRCUITS; SURFACE AND VOLUME RESISTIVITY AT ELEVATED TEMPERATURE FOR PROTRACTED PERIODS OF TIME.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-296 356
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

INSPECTING AND TESTING OF EMBEDDING MATERIALS AND COMPONENTS OF ELECTRICAL MODULES BEFORE, DURING AND AFTER ASSEMBLY: A PARTIALLY ANNOTATED BIBLIOGRAPHY (U)

NOV 62 1V PIERCE,CHARLIE M.;
REPT. NO. SB62 433 80 62 28

UNCLASSIFIED REPORT

DESCRIPTORS: *EMBEDDING SUBSTANCES, *ENCAPSULATION, AGING (MATERIALS), BIBLIOGRAPHIES, CONTAMINATION, DEGRADATION, EFFECTIVENESS, ELECTRON MICROSCOPY, ELECTRONIC EQUIPMENT, EPOXY PLASTICS, ISOCYANATE PLASTICS, MEASURING DEVICES (ELECTRICAL + ELECTRONIC), MICROORGANISMS, MINE STERILIZERS, NON-DESTRUCTIVE TESTING, PLASTICS, POLAROGRAPHIC ANALYSIS, PRINTED CIRCUITS, RADIOGRAPHY, RESISTANCE (ELECTRICAL), SEALING COMPOUNDS, SPACECRAFT, STRAIN GAGES, STRESSES, TEST METHODS (U)

AD-296 3569N4 +++BIBLIOGRAPHY ON INSPECTION AND TESTING OF EMBEDDING MATERIALS AND COMPONENTS OF ELECTRONICS MODULES BEFORE, DURING, AND AFTER ASSEMBLY. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-412 282
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

VACUUM DE-GASSING OF ENCAPSULANTS, (U)

JUN 61 17P DEFELICE,A.;
REPT. NO. MRI267 01

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENCAPSULATION, MANUFACTURING METHODS), (*MODULES (ELECTRONIC), DEGASIFICATION), VACUUM APPARATUS, EPOXY PLASTICS, POLYETHYLENE PLASTICS, TEMPERATURE, TESTS, BUBBLES, CRAZING, HARDNESS, CASTING. (U)
IDENTIFIERS: 1961, VACUUM IMPREGNATOR. (U)

PROCESSES AND TECHNIQUES FOR THE OPERATION OF THE VACUUM IMPREGNATOR FOR DE-GASSING THE RESINS USED FOR ENCAPSULATING ELECTRONIC MODULES IS REPORTED. A TOTAL OF 225 DISTINCT TESTS WERE RUN USING 9 DIFFERENT RESIN FORMULATIONS. RESIN TYPES INCLUDED EPOXIES AND POLYURETHANES. TWO FACTORS, PRE-MIX TEMPERATURE OF INGREDIENTS AND APPLICATION OF VACUUM WERE VARIED. THE RESULTING SAMPLES WERE EVALUATED FOR BUBBLES, CRACKS, CRAZING AND HARDNESS. APPLICATION OF VACUUM TO BATCHES PRIOR TO CASTING AND CURING PROVED EFFECTIVE FOR DE-GASSING ENCAPSULATING MATERIALS FOR MOST OF THE FORMULATIONS TESTED. TAKEN OVER ALL THE RESULTS VARIED WIDELY, RANGING FROM PERFECT TO UNACCEPTABLE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-427 412
PICATINNY ARSENAL DOVER N J AMMUNITION ENGINEERING DIRECTORATE

ENCAPSULATING PROPELLANTS BY MEANS OF ULTRASONIC WELDING, (U)

DEC 63 16P ZGLENICKI,CHARLES ;SILBERMAN, LOUIS ;
REPT. NO. AED-TM-1308

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•ULTRASONIC RADIATION, WELDING), (•PROPELLANT TANKS, WELDING), (•WELDING, PROPELLANT TANKS), ENCAPSULATION, ALUMINUM, TESTS, INDUSTRIAL EQUIPMENT, STORAGE (U)
IDENTIFIERS: ULTRASONIC WELDING, 1963 (U)

AN AL CONTAINER HOLDING M5 PROPELLANT HAS CAUSED FUNCTIONAL PROBLEMS BECAUSE OF INADEQUATE SEALING. THE ULTRASONIC WELDING APPROACH PROVIDED THE MOST EFFECTIVE AND DURABLE SEAL. ONE HUNDRED AND THIRTY-THREE CONTAINERS SEALED BY ULTRASONIC WELDING WITHSTOOD 28 DAYS TEMPERATURE CYCLING WITHOUT ANY DETECTABLE LEAKAGE. THIRTY-FIVE CONTAINERS FILLED WITH M5 PROPELLANT WERE TEMPERATURE-CYCLED AND EXPOSED TO A SOLVENT-SATURATED ATMOSPHERE FOR 11 DAYS. CLOSED BOMB TESTS OF THE PROPELLANT AFTERWARD INDICATED AN EFFECTIVE SEAL WAS ACHIEVED. METICULOUS ATTENTION TO SURFACE CLEANLINESS IS NOT REQUISITE TO ACHIEVE SOUND WELDS. FOIL THIN COVERS WHICH PRESENT A MINIMUM RESISTANCE TO PROPAGATION OF EXPLOSIVE EFFECTS CAN BE WELDED. PROPELLANT TRAPPED IN THE WELD ZONE DID NOT IGNITE. SIGNIFICANT COST SAVINGS CAN BE REALIZED IN HIGH VOLUME PRODUCTION OVER METHODS USING SPECIAL SEALANTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-430 751
NAVAL RESEARCH LAB WASHINGTON D C

ENCAPSULATION TECHNIQUES FOR NRL IRRADIATION EFFECTS STUDIES. (U)

DESCRIPTIVE NOTE: PROGRESS REPT.,
DEC 63 23P STEELE,L. E. ;HAWTHORNE,J. R.
;
REPT. NO. NRL-MR-1481
PROJ: SR007 01 01
TASK: 0858

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, RADIATION DAMAGE), (*CONTAINERS, DESIGN), ENCAPSULATION, NUCLEAR REACTORS, REACTOR MATERIALS, TEST REACTORS, MECHANICAL PROPERTIES, THERMAL RADIATION, POWER REACTORS, STAINLESS STEEL, ALUMINUM, TEST FACILITIES (U)
IDENTIFIERS: 1963, NUCLEAR RADIATION (U)

VARIOUS SYSTEMS AND TECHNIQUES FOR ENCAPSULATION OF IRRADIATION EXPERIMENTS HAVE BEEN DEVISED IN THE COURSE OF SEVERAL YEARS OF RESEARCH USING SEVERAL AEC TEST REACTOR FACILITIES. A CAPSULE DESIGN PHILOSOPHY HAS EVOLVED WHICH IS BASED UPON THE USE OF TWO TYPES OF CAPSULES, SEALED UNITS AND EXTERNALLY CONTROLLED UNITS FOR THE IRRADIATION OF LARGE NUMBERS OF METALLURGICAL SPECIMENS UNDER A RANGE OF THERMAL AND NUCLEAR CONDITIONS. THE BASIC PHILOSOPHY OF CAPSULE DESIGN IS DESCRIBED ALONG WITH SPECIFIC TECHNIQUES UTILIZED FOR VARIOUS TEST REACTOR CAPSULES AND FOR LONG-TERM POWER REACTOR SURVEILLANCE CAPSULES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-432 229
NAVAL BOILER AND TURBINE LAB PHILADELPHIA PA

EVALUATION OF HIGH TEMPERATURE INSTRUMENTATION FOR DYNAMIC ANALYSIS. ENCAPSULATED STRAIN GAGE INSTALLATION FOR USE IN STEAM ENVIRONMENT, (U)

FEB 64 49P TOLOTTA,S. ;
PROJ: A384
TASK: SF013 06 20 ,SUBTASK 3950

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*STRAIN GAGES, STEAM), (*BOILERS, INSTRUMENTATION), SEALS (STOPPERS), INSTALLATION), WELDS, ENCAPSULATION, FRACTURE (MECHANICS) THERMAL STRESSES, HIGH TEMPERATURE RESEARCH (U)
IDENTIFIERS: 1964 (U)

AN INSPECTION OF THE INTERIOR OF A STEAM DRUM ABOARD THE USS DECATUR REVEALED A CRACK EXTENDING AROUND THE UPPER HALF OF THE MANWAY. THE STRESSES CAUSING THE FAILURE WERE THOUGHT TO BE HIGHLY CONCENTRATED; THEREFORE, IT WAS NECESSARY TO USE A STRAIN GAGE WITH A SHORT GAGE LENGTH (1/8 IN) THAT COULD OPERATE IN A SATURATED STEAM ATMOSPHERE AT 1200 PSIG. BECAUSE THERE WERE NO KNOWN CEMENTS OR PROTECTIVE COATINGS WHICH WERE CAPABLE OF OPERATION IN THE PROPOSED ENVIRONMENT, IT WAS NECESSARY TO DEVELOP A SPECIAL GAGE INSTALLATION. THE UNIT DEVELOPED CONSISTED OF A STRAIN GAGE CEMENTED ATOP A STAINLESS STEEL SHIM WHICH HAD BEEN TACK WELDED TO THE TEST SPECIMEN AND THEN SEALED BY SILVER SOLDERING. THIS TYPE INSTALLATION WAS CAPABLE OF MEETING THE REQUIREMENTS. DETAILED INSTRUCTIONS FOR CONSTRUCTION, INSTALLATION AND CALIBRATION ARE DESCRIBED IN APPENDIXED INSTRUMENT STANDARDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-433 654
PHILCO CORP LANSDALE PA

PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT. (U)

DESCRIPTIVE NOTE: FINAL PROGRESS REPT., 30 APR 62-31 DEC 63,
DEC 63 210P SANDERS, J. G. ;
CONTRACT: DA36 039SC86720
PROJ: R232

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•TRANSISTORS, MANUFACTURING METHODS), (•SPECIFICATIONS, PROCESSING), GERMANIUM, ELECTRODES, NICKEL, TIN ALLOYS, ZINC ALLOYS, GALLIUM ALLOYS, HEAT RESISTANT METALS AND ALLOYS, DEGASIFICATION, ENCAPSULATION, EMISSIVITY, COATINGS, MASS SPECTROSCOPY, TEST METHODS, LIFE EXPECTANCY, QUALITY CONTROL (U)
IDENTIFIERS: JET ETCH TYPE TRANSISTOR, 1963, THERMAL RESISTANCE (U)

THE WORK FOR RELIABILITY IMPROVEMENT OF THE JET ETCH TYPE TRANSISTOR THROUGH PROCESS IMPROVEMENTS IS COMPLETE. THE REPORT INCLUDES THE OVER-ALL PROCESSING SPECIFICATION FOR THE IMPROVED TRANSISTOR, AND THE APPLICABLE INSPECTION AND QUALITY CONTROL PLAN. DATA ARE GIVEN ON THE FINAL TEST LOT OF THE IMPROVED DEVICE AND INDICATE THE LOT ACCEPTANCE TEST WAS PASSED. THE METHOD DEVISED FOR ACCELERATED TESTING AND EXTRAPOLATION OF RELIABILITY LEVELS UNDER USE CONDITIONS WAS EFFECTIVELY DEMONSTRATED. ACCUMULATED DATA ON TRANSISTORS PRODUCED USING THE IMPROVED PROCESSES SHOW THAT AN ACCELERATION CURVE HAVING A SLOPE EQUIVALENT TO AN ACTIVATION ENERGY OF 19.6 KCAL/MOLE IS REALISTIC FOR THE IMPROVED DEVICE. THERMAL RESISTANCE MEASUREMENT STUDIES SHOWED THAT THE D-C BETA METHOD OF TEST WITH VOLTAGE COMPENSATION GIVES RESULTS THAT ARE REPRODUCIBLE AND CLOSELY APPROACH THE VALUES OF EFFECTIVE THERMAL RESISTANCE DETERMINED FROM OPERATING AND STORAGE LIFE TESTS. THE MAXIMUM OPERATING RATING OF THE IMPROVED TRANSISTOR IS REPORTED AS 150 MW AT 25 C AT A LAMBDA = 0.78. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-435 114
RADIO CORP OF AMERICA SOMERVILLE N J

PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON PLANAR EPITAXIAL TRANSISTOR. VOLUME I. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 MAY 62-30 NOV 63,
NOV 63 160P GRANGER,G. F. ;POSSEMATO,L. R. ;
CONTRACT: DA36 039SC86729

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TRANSISTORS, EPITAXIAL GROWTH), RELIABILITY, SILICON, ELECTRONIC SWITCHES, ELECTRICAL PROPERTIES, PROCESSING, MANUFACTURING METHODS, CRYSTAL SUBSTRUCTURES, PHOTOENGRAVING, SEMICONDUCTOR DEVICES, DIFFUSION, METALLURGY, GOLD ALLOYS, WIRE, GOLD, ALUMINUM, PELLETS, ENVIRONMENTAL TESTS, FIXED CONTACTS, METAL SEALS, NICKEL, ENCAPSULATED, STORAGE, TESTS, STRESSES, ACCELERATION, FAILURE (MECHANICS), DISSIPATION, OPERATION, LIFE EXPECTANCY, AGING (MATERIALS), SWITCHING CIRCUITS (U)
IDENTIFIERS: 1963 (U)

A PRODUCTION RUN WAS MADE TO DEMONSTRATE THE RELIABILITY ACHIEVED AS A RESULT OF PROCESS IMPROVEMENTS INCORPORATED INTO THE PROCESSING. A SUMMARY OF THE WORK PERFORMED IN EACH OF THE MAJOR PROCESSING AREAS TO EFFECT THE IMPROVEMENT IS DESCRIBED IN THIS REPORT. A PROGRAM OF LIFE TESTING, ANALYSIS OF EXISTING LIFE TEST DATA AND FAILURE ANALYSIS WAS PERFORMED CONCURRENTLY WITH THE WORK IN THE PROCESSING AREA. THIS PROGRAM INCLUDED ACCELERATED TESTING ON BOTH STORAGE AND OPERATING LIFE TESTS WHICH LEAD TO THE ESTABLISHMENT OF ACCELERATION CURVES, THE ANALYSIS OF RESULTS ON EXTENDED LIFE TESTS, THE ANALYSIS OF FAILURES, AND A STUDY OF THE EFFECT OF AGING. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-443 097
SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
ELECTRONIC DEFENSE LABS

NONCOMMUNICATIONS EXPENDABLE JAMMER INVESTIGATIONS.
VOLUME 3. MECHANICAL DEVELOPMENT, (U)

APR 64 55P FIRTH,MILTON ;REICHHOLD,
RALPH ;
REPT. NO. EDL G220 ,VOL. 3
CONTRACT: DA36 039AMC00088E

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•RADIO JAMMING, LANDING IMPACT), (•LANDING IMPACT, PACKAGING), RADAR JAMMING, AIR DROP OPERATIONS, SEMICONDUCTOR DEVICES, MODULES (ELECTRONIC), SHOCK (MECHANICS), ENCAPSULATION, DROP TESTING, MATHEMATICAL ANALYSIS, SUBMINIATURE ELECTRONIC EQUIPMENT, MICROMINIATURIZATION (ELECTRONICS), SHOCK RESISTANCE, MOUNTING BRACKETS (U)
IDENTIFIERS: EXPENDABLE JAMMER (U)

RESULTS ARE REPORTED OF A STUDY TO DETERMINE OPTIMUM PACKAGING TECHNIQUES FOR THE ELECTRONIC EQUIPMENT AND THE SHOCK LEVELS THAT THE DIFFERENT PACKAGES AND CERTAIN ELECTRONIC COMPONENTS COULD WITHSTAND, AS WELL AS LANDING TECHNIQUES AND SHOCK ATTENUATION DEVICES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-489 906 9/1
SPEER CARBON CO NIAGARA FALLS N Y

RESISTORS FOR MICROPOWER CIRCUITS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 4, 1 APR-30 JUN 66,
OCT 66 13P PARKS, CHARLES F. ;
REPT. NO. SCC-24, R-140
CONTRACT: DA-28-043-AMC-01524(E)
PROJ: DA-1P6-22001-A-057
TASK: 1P6-22001-A-057-06
MONITOR: ECOM 01524-4

UNCLASSIFIED REPORT

DESCRIPTORS: (*RESISTORS, DESIGN), SURFACE PROPERTIES, OPTIMIZATION, ENCAPSULATION, ELECTRIC CONNECTORS, ELECTRIC WIRE, PROCESSING, PREPARATION, SUBSTRATES, ELECTRICAL PROPERTIES, TEMPERATURE, RESISTANCE(ELECTRICAL), NOISE(RADIO), FILMS (U)
IDENTIFIERS: MICROPOWER RESISTORS (U)

MICROPOWER RESISTORS OF 4.7 MEGOHM RESISTANCE VALUE HAVE BEEN PREPARED IN FINISHED FORM FOR TESTING ACCORDING TO SPECIFICATIONS. PRELIMINARY INVESTIGATIONS INCIDENT TO THEIR PREPARATION HAVE BEEN COMPLETED. THE STRENGTH OF SUBSTRATES HAS BEEN STUDIED, AND PROCESSING PARAMETERS IN THE PRESSING OPERATION HAVE BEEN EVALUATED. FABRICATION OF SUBSTRATES UNDER CONDITIONS INDICATED IN THIS INVESTIGATION HAS BEEN ACCOMPLISHED, AND SUBSTRATES OF SATISFACTORY STRENGTH HAVE BEEN PRODUCED. A NUMBER OF OTHER RESISTOR PROCESSING VARIABLES HAVE ALSO BEEN EXAMINED. THE SURFACE PREPARATION OF SUBSTRATES AND THE USE OF VARIOUS TERMINATING MATERIALS HAVE BEEN INVESTIGATED FOR EFFECTS ON RESISTANCE AND NOISE. IMPROVEMENT IN PROPERTIES OF RESISTORS HAS BEEN OBTAINED. DIFFERENT RESISTIVE PASTES HAVE BEEN COMPARED TO PERMIT SELECTION OF ONE PRODUCING AN OPTIMUM COMBINATION OF FIRED PROPERTIES. FIRED RESISTIVE FILMS ON THE NEW SUBSTRATE SYSTEM HAVE BEEN HELIXED SUCCESSFULLY USING THE IMPROVED HELIXING MACHINE, AND A NEWLY INSTALLED BRIDGE CIRCUIT HAS PERMITTED REPRODUCIBLE HELIXING TO VALUE. ENCAPSULATION OF HELIXED UNITS HAS BEEN INVESTIGATED AND EFFECTS ON RESISTANCE VALUE AND TEMPERATURE COEFFICIENT OF RESISTANCE HAVE BEEN FOUND TO BE ESSENTIALLY NEGLIGIBLE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-601 772
NATIONAL CASH REGISTER CO DAYTON OHIO

A STUDY OF THE ENCAPSULATION OF HIGH ENERGY SUBSTANCES. (U)

DESCRIPTIVE NOTE: FINAL REPT., 1 APR 59-31 DEC 63.
APR 64 69P PETROPOULOS,CONSTANTINE C. ;
CONTRACT: NONR2848 00

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•LIQUID ROCKET PROPELLANTS, ENCAPSULATION), (•ENCAPSULATION, LIQUID ROCKET PROPELLANTS), (•PLASTICS, COMPATIBILITY), FILMS, PERMEABILITY, HYDRAZINE, POLYAMIDE PLASTICS, ARCYLIC RESINS, POLYMERIZATION COPOLYMERIZATION (U)
IDENTIFIERS: GLYCIDYL METHACRYLATE, HYDROXYETHYL METHACRYLATES, METHALLYL METHACRYLATE, VINYLOXYETHYL METHACRYLATES (U)

INITIAL WORK WAS DIRECTED TOWARDS THE UNDERSTANDING OF BASIC FACTORS RESPONSIBLE FOR SMALL MOLECULES PERMEATING POLYMERIC FILMS. PROGRESS WAS MADE IN THIS AREA. IN ADDITION, RESEARCH WAS CONDUCTED IN THE AREA OF ENCAPSULATION. THIS RESEARCH INCLUDED THE STUDY OF BASIC MECHANISMS ASSOCIATED WITH ENCAPSULATION, COMPATIBILITY OF POLYMERS WITH POTENTIAL LIQUID FUELS (E. G. HYDRAZINE), SYNTHESIS OF NEW POLYMERS, AND THE ENCAPSULATION OF LIQUID FUELS OR MODEL COMPOUNDS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-602 270
MOTOROLA INC SCOTTSDALE ARIZ

MINIATURE THIN FILM INDUCTORS (MODIFICATION NO. 2). (U)

DESCRIPTIVE NOTE: FINAL DEVELOPMENT REPT. FOR 27 MAY 63-27 MAY 64,
JUN 64 78P GLEASON,F. R. ;
REPT. NO. 4003
CONTRACT: NOBSR85397
PROJ: SR00803
TASK: 9636

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MINIATURE ELECTRONIC EQUIPMENT, (COILS), (*COILS, METAL FILMS), FILMS, GOLD, ENCAPSULATION, FERRITES, NICKEL ALLOYS, ZINC ALLOYS, COBALT ALLOYS, INDUCTANCE, SPRAYS, CHLORIDES, VAPOR PLATING, EVAPORATION, ELECTRODEPOSITION (U)
IDENTIFIERS: THIN FILMS (U)

THE REPORT DESCRIBES A PROGRAM DIRECTED TOWARD THE DEVELOPMENT OF TECHNIQUES FOR FABRICATING MINIATURE THIN-FILM INDUCTORS. THE BASIC DEVICE CONSISTS OF A FLAT SPIRAL CONDUCTING PATH DEPOSITED ON A BULK FERRITE SUBSTRATE AND ENCAPSULATED WITH A FERRITE FILM DEPOSIT. THE GOAL OF THE PROGRAM WAS TO FABRICATE THESE INDUCTANCES IN A RANGE FROM 38 TO 1000 MICROHENRIES WITH A Q-VALUE OF 100 MEASURED AT 1 MC. THE TECHNIQUE FOR DEPOSITING THE FERRITE FILM BY THE SPRAY HYDROLYSIS OF A CHLORIDE SOLUTION IS DESCRIBED. THE SPIRAL COILS WERE MADE FROM GOLD AND DEPOSITED BY A COMBINATION OF VACUUM EVAPORATION AND ELECTRODEPOSITION TECHNIQUES. THE MAXIMUM AIR CORE COIL INDUCTANCE OBTAINED IN AN AREA 0.3 INCH SQUARE WAS 1.8 MICROHENRIES. THE LARGEST INDUCTANCE VALUE OBTAINED FOR A SINGLE ENCAPSULATED COIL WAS 54 MICROHENRIES WITH A Q-VALUE OF 6 AT 1 MC. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-602 939
TEXAS INSTRUMENTS INC DALLAS

PRODUCTION ENGINEERING MEASURES TO INCREASE TRANSISTOR RELIABILITY FOR THE 2N656. (U)

DESCRIPTIVE NOTE: FINAL PROGRESS REPT. FOR 1 JUL 62-31 MAR 64.
MAR 64 248P
REPT. NO. 03 64 43
CONTRACT: DA36-039SC86730

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: A PORTION OF THIS DOCUMENT IS ILLEGIBLE OR NONREPRODUCIBLE.

DESCRIPTORS: (*TRANSISTORS, RELIABILITY (ELECTRONICS)), (*QUALITY CONTROL, TRANSISTORS), ENGINEERING, PRODUCTION CONTROL, SILICON, COATINGS, DIFFUSION, BANDING, WELDING, ENCAPSULATION, TEST METHODS, GOLD ALLOYS, STRESSES, TESTS, MILITARY REQUIREMENT (U)
IDENTIFIERS: THICK FILMS, PLANAR (U)

THE PROCESS IMPROVEMENT WORK ON THE 2N656 DEVICE WAS COMPLETED DURING THE FIRST TWELVE MONTHS OF THE CONTRACT. THE RESULTANT TRANSISTOR IS A RUGGED PLANAR DEVICE UTILIZING GOLD ALLOY WAFER MOUNTING, ULTRASONIC LEAD BONDING WITH NO INLINE ETCH OR WAFER COATING AND IS CAPABLE OF 15 WATTS DISSIPATION AT 100C CASE TEMPERATURE. IMPROVED FACILITIES, PROCESSES AND PROCESS CONTROLS IN THE DIFFUSION, PHOTO RESIST, CONTRACT EVAPORATION AND ASSEMBLY AREAS HAVE ALL CONTRIBUTED TO THE SIGNIFICANTLY IMPROVED PRODUCT QUALITY AND UNIFORMITY. THE MAJOR PORTION OF RELIABILITY IMPROVEMENT HAS RESULTED FROM THE PLANARIZATION OF THE DEVICE AND THE RE-DESIGN OF THE PACKAGE WHICH REPLACED THE SINGLE 0.017 IN. DIAMETER WIRE SLUG SUPPORT WITH TWO APPROXIMATELY 0.015 IN. THICK BY 0.090 IN. WIDE TABS. STRESS TESTS CONDUCTED ON 1,100 PRODUCTION PLANAR DEVICES CONFIRM THAT THE IMPROVED TRANSISTOR EXCEEDS THE CONTRACT OBJECTIVE OF 0.01% PER THOUSAND OPERATING HOURS AT A 90% CONFIDENCE LEVEL. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-604 196
CLEVITE TRANSISTOR PRODUCTS WALTHAM MASS

PRODUCTION ENGINEERING MEASURE FOR THE IMPROVEMENT OF GERMANIUM ALLOY POWER TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 7, 31 OCT 63-31 JAN 64,
JAN 64 24P KELLEY,LUCILLE T. ;LOCONTE, JEREMIAH A. ;
CONTRACT: DA36 039SC86724

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TRANSISTORS, GERMANIUM), (*MANUFACTURING METHODS, TRANSISTORS), DESIGN, QUALITY CONTROL, RELIABILITY (ELECTRONICS), FAILURE (MECHANICS), STRESSES, LIFE EXPECTANCY, ALLOYS, SOLDERING, CHEMICAL MILLING, ENCAPULATION, DESSICANTS, ENVIRONMENTAL TESTS, SEMICONDUCTOR DEVICES (U)

ENGINEERING DESIGN CHANGES HAVE BEEN COMPLETED AND EVALUATED. THE NEW PROCESS AND PRODUCTION TECHNIQUES HAVE BEEN EVALUATED AND IMPLEMENTED INTO THE PRODUCTION LINE FLOW. ALL UNITS IN THE FINAL PRODUCTION RUN WERE ASSEMBLED ACCORDING TO CONDITIONS SPECIFIED IN THE FINAL CONTRACT AGREEMENT. QUALITY CONTROL PROCEDURES HAVE BEEN REVIEWED. THE Q. C. MANUAL WILL BE INCLUDED IN THE FINAL REPORT. FINAL RELIABILITY PROOF TESTING IS IN PROCESS. AN IMPROVED FAILURE RATE IS INDICATED, BUT AT THIS DATE THE DATA IS INSUFFICIENT TO DRAW FINAL CONCLUSIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-605 159
JOHNS HOPKINS UNIV BALTIMORE MD

ANALOG COMPUTER RESEARCH INTO THE ENERGY-EXCHANGE BETWEEN GASES AND SOLIDS. (U)

DESCRIPTIVE NOTE: SCIENTIFIC REPT.,
MAY 64 316P ROGERS,MILTON ;
CONTRACT: AF49 638 496
MONITOR: AFOSR , 1001

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TRANSPORT PROPERTIES, THERMODYNAMICS), (*ENERGY, TRANSPORT PROPERTIES), GASES, SOLIDS, PARTICLES, FLUID MECHANICS, TEMPERATURE, SURFACES, CHEMISORPTION, ADSORPTION, MATHEMATICAL ANALYSIS, ANALOG COMPUTERS (U)
IDENTIFIERS: ENERGY EXCHANGE (U)

A COMPARISON IS MADE BETWEEN VARIOUS MODELS OF THE INTERACTION. A DESCRIPTION IS GIVEN OF THE CIRCUITRY AND TECHNIQUES USED TO INVESTIGATE THE PROBLEM OF ENERGY EXCHANGE BETWEEN GASES AND SOLIDS. BOUNDS ON THE APPLICABILITY AND INTERPRETATION OF DATA OBTAINED SOLELY FROM COMPUTATIONAL EXPERIMENTS, WHETHER PERFORMED WITH AN ANALOG OR A DIGITAL COMPUTER, ARE DELINEATED IN SOME DETAIL. DATA ARE PRESENTED WHICH WAS OBTAINED IN A SERIES OF ANALOG COMPUTER EXPERIMENTS IN GAS SURFACE INTERACTIONS USING SEVERAL VARIATIONS OF A VERY SIMPLE MODEL OF THE INTERACTION POTENTIAL, THE LATTICE, AND THE PHYSICAL STATE OF THE SOLID, PARTICULARLY TEMPERATURE. FOR THE MAJORITY OF THE RESEARCH, A NON-LINEAR COUPLING (POTENTIAL) WAS USED BETWEEN GAS PARTICLES AND SURFACE ATOM. SEVERAL MAJOR APPROXIMATIONS WERE MADE IN THE FORMULATION OF THE MODELS INVESTIGATED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-605 984
TRW SPACE TECHNOLOGY LABS LOS ANGELES CALIF

LOW PRESSURE ELECTRICAL DISCHARGE STUDIES, (U)

DEC 59 72P KREBS,W. H. ;REED,A. C. ;
REPT. NO. STL/TR-59-0000-09931
CONTRACT: AF04 647 309

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ELECTRIC DISCHARGES, HIGH ALTITUDE), (*GUIDED MISSILE COMPONENTS, MALFUNCTIONS), AIR, WATER VAPOR, SPARKS, SECONDARY EMISSION, ELECTRICAL EQUIPMENT, LOW-PRESSURE RESEARCH, ELECTRODES, ELECTRICAL PROPERTIES, GEOMETRIC FORMS, ENCAPSULATION, CASTING, REVIEWS, BIBLIOGRAPHIES (U)
IDENTIFIERS: BREAKDOWN (ELECTRICAL) (U)

THE REPORT CONCERNS ELECTRICAL BREAKDOWN OF AIR AT LOW PRESSURES OR HIGH ALTITUDES (70,000 TO 250,000 FEET) DUE TO SECONDARY EMISSION. INFORMATION PERTINENT TO THE PROBLEM OF LOW FREQUENCY (0 TO 1000 CPS) SPARKING WAS COMPILED THROUGH A LITERATURE SURVEY. A BIBLIOGRAPHY CONCERNING ELECTRICAL BREAKDOWN AT BOTH LOW AND HIGH FREQUENCIES WAS COMPILED. A TEST PROGRAM YIELDED THE FOLLOWING RESULTS: NO STATISTICALLY SIGNIFICANT DEVIATION FROM PASCHEN'S LAW WAS DETECTED. THE ADDITION OF WATER VAPOR TO THE AIR CONSTITUTING THE TEST ENVIRONMENT CAUSED A SIGNIFICANT LOWERING OF THE MINIMUM SPARKING VOLTAGE. RECOMMENDATIONS ARE MADE RELATIVE TO TEST PROGRAMS FOR MISSILE ELECTRICAL COMPONENTS EMPLOYING VOLTAGES HIGHER THAN 200 VOLTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-611 752
MITRE CORP BEDFORD MASS

LEAD ATTACHMENT AND ENCAPSULATION TECHNIQUES FOR THIN FILM MICROCIRCUITS, (U)

FEB 65 16P EVERETT,PATRICK N. ;
REPT. NO. W-6353
CONTRACT: AF19 628 2390
PROJ: 708 0
MONITOR: ESD ; TDR-64-630

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PACKAGED CIRCUITS, MANUFACTURING METHODS), (*ENCAPSULATION, PACKAGED CIRCUITS), (*MICROMINIATURIZATION (ELECTRONICS), ELECTRIC CONNECTORS), ELECTRIC WIRE, ATTACHMENT, METAL FILMS, BONDING, SOLDERING, EPOXY PLASTICS, MODULES (ELECTRONICS), RESISTORS, SEMICONDUCTOR DEVICES, PRINTED CIRCUITS (U)
IDENTIFIERS: THIN FILMS (M)

THE TECHNIQUES DESCRIBED WERE DEVELOPED FOR ENCAPSULATING EXPERIMENTAL THIN FILM CIRCUITS DEPOSITED ON 0.5-INCH SQUARE GLASS SUBSTRATES. THE ENCAPSULATION IS EPOXY, WITH FINAL PACKAGE DIMENSIONS OF 0.6-INCH SQUARE X .125-INCH THICK. UP TO 32 RIBBON LEADS EMERGE, ON .050 CENTERS, ARRANGED ON THE PERIPHERY OF THE PACKAGE. A FACTOR COMPLICATING THE ENCAPSULATION WAS THE REQUIREMENT THAT THE LEADS EMERGE ON THE FOUR EDGES OF THE UNIT. A MOLDING PROCESS USING SILICONE RUBBER MOLDS, AND A HYPODERMIC FILLING ARRANGEMENT WAS EVOLVED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-620 933
NATIONAL CASH REGISTER CO DAYTON OHIO CAPSULAR RESEARCH AND PRODUCT DEVELOPMENT DEPT

ENCAPSULATION OF VIRUSES. (U)

DESCRIPTIVE NOTE: REPT. FOR MAR-OCT 64,
AUG 65 40P ANDERSON,JERROLD L. ;BUTZ, S. DAVID ;
CONTRACT: AF29 601 6344
PROJ: AF-8803
MONITOR: AFWL TR-64-167

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*VIRUSES, ENCAPSULATION), (*ENCAPSULATION, BACTERIOPHAGES), (*BACTERIOPHAGES, ENCAPSULATION), VIABILITY, TOXICITY, ETHYL CELLULOSE, SPACE BIOLOGY, RADIATION EFFECTS, RADIOLOGICAL DOSAGE, DOSIMETERS, PHOTOGRAPHIC EMULSIONS (U)
IDENTIFIERS: LYOPHILIZATION (U)

RESEARCH EFFORTS WERE DIRECTED TOWARD DEVELOPMENT OF A METHOD OF ENCAPSULATING VIRUSES IN SPHERES CONTAINING A PREDICTABLE PHAGE TITER TO BE USED IN BIOLOGICAL DOSIMETRY EXPERIMENTS. INITIAL STUDIES DEMONSTRATED THE ABILITY OF THE BACTERIOPHAGE TO UNDERGO LYOPHILIZATION AND ENCAPSULATION YIELDING A PRODUCT OF ADEQUATE VIABILITY. THE BUTAREZ TOLUENE ETHYLCELLULOSE ENCAPSULATION SYSTEM PROVED SATISFACTORY FOR PRODUCING SPHEROIDAL VIRUSETHYLCELLULOSE CAPSULES OF TWENTY-FIVE TO FIFTY MICRONS DIAMETER, THE MEAN DIAMETER BEING FORTY-TWO MICRONS. VIABILITY DETERMINATIONS YIELDED A PHAGE TITER OF 1.7 X 10 TO THE 11TH POWER PHAGES PER GRAM OF CAPSULES; HENCE, A CAPSULE OF AVERAGE DIAMETER POSSESSED A THEORETICAL TITER OF 8 X 1000 PHAGES. SIMULATED END-USE TESTS PROVED PHOTOGRAPHIC DEVELOPER CHEMICALS, SUCH AS COULD BE USED FOR THE PROCESSING OF VIRUS-BEARING NUCLEAR EMULSIONS, TO BE NONTOXIC TO THE ENCAPSULATED PHAGES. A MODIFICATION IN THE SCOPE OF THE PROGRAM DIRECTED THE CONCLUDING WORK TO THE PREPARATION OF CAPSULES LESS THAN FIFTEEN MICRONS IN DIAMETER. SAMPLES OF VIRUSETHYLCELLULOSE CAPSULES WERE SUBMITTED TO THE AIR FORCE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-625 956 9/1
SYLVANIA ELECTRIC PRODUCTS INC WOBURN MASS SEMICONDUCTOR DIV

RELIABILITY ANALYSIS OF X-BAND TUNNEL DIODES. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT.,
DEC 65 74P DAVIS,CHARLES ;LUECK,ARTHUR
;
CONTRACT: AF30(602)-3487
PROJ: AF-4519
TASK: 451901
MONITOR: RADC ; TR-65-291

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-615 498.

DESCRIPTORS: (*TUNNEL DIODES, RELIABILITY(ELECTRONICS)), X-BAND, MANUFACTURING METHODS, PROCESSING, SEMICONDUCTOR DEVICES, ENCAPSULATION, GERMANIUM ALLOYS, TIN ALLOYS, ARSENIC, GALLIUM (U)

THE REPORT PRESENTS AN ACCOUNT OF A MICROWAVE TUNNEL DIODE IMPROVEMENT PROGRAM, AND THE RESULTS OBTAINED FROM RELIABILITY TESTS PERFORMED ON DEVICES FABRICATED BY THE IMPROVED PROCESSES. A NEW SOLID STRUCTURE TUNNEL DIODE WAS DEVELOPED DURING THIS CONTRACT WHICH EXHIBITS SUPERIOR RELIABILITY CHARACTERISTICS TO ANY PREVIOUSLY TESTED TUNNEL DIODE. THE PROCESS AND FABRICATION DETAILS FOR THIS DEVICE ALONG WITH RELIABILITY DATA ARE INCLUDED IN THE REPORT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-628 537 11/9 9/1
HARRY DIAMOND LABS WASHINGTON D C

LOW-LOSS STYRENE-TYPE FOAM-IN-PLACE ENCAPSULATING RESINS, (U)

OCT 65 24P ENGELHARDT,F. J. O. ;
REPT. NO. TR-1308,
PROJ: DA-1P523801A300 ;HDL-96300

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•ENCAPSULATION, STYRENE PLASTICS), (•STYRENE PLASTICS, ENCAPSULATION), (•EXPANDED PLASTICS, ENCAPSULATION), STYRENES, PROPELLANTS, POLYMERIZATION, POWDERS, DIELECTRIC PROPERTIES, RADIOFREQUENCY, COMPRESSIVE PROPERTIES, DENSITY (U)
IDENTIFIERS: POTTING COMPOUNDS (U)

LOW-DIELECTRIC-LOSS STYRENE-TYPE FOAM-IN-PLACE ENCAPSULATING RESINS ARE NOT AVAILABLE COMMERCIALLY. SUCH A RESIN HAS NOW BEEN DEVELOPED. A PROPELLANT WAS ADDED TO THE CATALYZED STYRENE-POLYSTYRENE MIXTURE; AS THE TEMPERATURE OF THE POLYMERIZING RESIN ROSE, THE PROPELLANT EXPANDED THE RESIN INTO A CELLULAR STRUCTURE. HOMOGENEOUS FOAMS WERE OBTAINED IN THE PRESENCE OF FINELY POWDERED POLYMERS, WHICH ACTED AS BUBBLE NUCLEATORS. THE RESULTANT RIGID FOAMS HAD DIELECTRIC CONSTANTS RANGING FROM 1.2 TO 1.8, AND LOSS TANGENTS FROM 0.0002 TO 0.001 OVER THE FREQUENCY RANGE 102 AND 108 CPS. SOME OF THESE MATERIALS HAD REMARKABLY FLAT LOSS-FREQUENCY CURVES, LOSSES RANGING ONLY BETWEEN 0.0004 AND 0.0005 OVER THE SAME FREQUENCY RANGE. DENSITIES WERE VARIED BETWEEN 0.194 AND 0.850 G/CU CM, OR BETWEEN 12 AND 53 LB/CU FT. THESE DATA INDICATE THE USEFULNESS OF THE NEW CELLULAR MATERIALS AS RF ENCAPSULATING RESINS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-628 618 9/1 13/8
PHILCO CORP LANSDALE PA

RESEARCH AND DEVELOPMENT LOW COST INTEGRATED CIRCUIT TECHNIQUES. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 15 JUN-14 SEP 65,
SEP 65 72P WAGNER,S. ;WALKER,M. ;
REPT. NO. PHILCO R-506;
CONTRACT: DA-28-043-AMC-01424(E),
PROJ: DA-1P622001056
TASK: 1P62200105602

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*INTEGRATED CIRCUITS, MANUFACTURING METHODS), (*ENCAPSULATION, INTEGRATED CIRCUITS), (*ELECTRIC CONNECTORS, INTEGRATED CIRCUITS), ELECTRIC WIRE, BONDING, SEMICONDUCTOR DEVICES, GLASS, COATINGS, DEPOSITION, EVAPORATION, VAPOR PLATING, PROCESSING, ASSEMBLING, PACKAGING, HERMETIC SEALS, PRINTED CIRCUITS (U)

THE USE OF AN ADHERENT IMPERVIOUS COATING FOR ENCAPSULATING SILICON INTEGRATED CIRCUITS, COMBINED WITH A BATCH MOUNTING AND INTERCONNECTION TECHNIQUE, WILL RESULT IN (1) DECREASED COST AS A RESULT OF PACKAGE ELIMINATION; (2) INCREASED PACKING DENSITY; (3) IMPROVED RELIABILITY DUE TO REDUCTION IN THE NUMBER OF CONTACTS AND ELIMINATION OF AU-AL THERMOCOMPRESSION BONDS. THIS REPORT DESCRIBES A TECHNIQUE FOR SELECTIVE DEPOSITION OF 1 TO 2 MICRON THICK GLASS ON SILICON INTEGRATED CIRCUITS AND ATTACHING THESE CIRCUITS TO A PRINTED CIRCUIT BOARD BY MEANS OF 'FLIP CHIP' MOUNTING. GLASS HAS BEEN DEPOSITED BY MEANS OF EVAPORATION AND PYROLYTIC VAPOR PLATING. EVAPORATION APPEARS TO HAVE SOME ADVANTAGES. EVALUATION OF TWO HIGH TEMPERATURE METALIZATION SYSTEMS (TI-AG-TI AND CR-AG-CR) HAS INDICATED SATISFACTORY PROPERTIES. A TEST MODEL EMPLOYING THESE TECHNIQUES HAS BEEN DESIGNED FOR ENVIRONMENTAL TESTING AND TECHNIQUE EVALUATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-628 833 9/5 13/4
DOUGLAS AIRCRAFT CO INC SANTA MONICA CALIF MISSILE AND SPACE SYSTEMS DIV

STRESS ANALYSIS OF ENCAPSULATION MATERIALS FOR WELDED MODULES, (U)

FEB 66 61P SMITH,M. H. ;
REPT. NO. SM-48410,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*MODULES(ELECTRONIC), ENCAPSULATION), (*ENCAPSULATION, MATERIALS), (*PACKAGING, TEST EQUIPMENT(ELECTRONICS)), WELDS, STRAIN GAGES, EPOXY PLASTICS, TRANSDUCERS, STRESSES, MATHEMATICAL ANALYSIS, EMBEDDING SUBSTANCES (U)

A STRAIN-GAUGE LOAD TRANSDUCER, SIMULATING AN AXIAL-LEADED DISCRETE COMPONENT, WAS DEVELOPED AND FABRICATED BY DAC TO MEASURE THE MAGNITUDE AND DIRECTION OF AXIAL STRESSES EXERTED BY AN ENCAPSULATING MATERIAL. THE EPOXY ENCAPSULATION MATERIALS EXHIBITED RESIDUAL COMPRESSIVE STRESSES DUE TO THE INITIAL CURE OF RESIN. THERMAL CYCLING SUBSTANTIALLY INCREASED THESE COMPRESSIVE STRESSES AT THE LOWEST TEMPERATURES. TENSILE STRESSES WERE RECORDED DURING THE ELEVATED TEMPERATURE PHASE OF THE TEST. COMPRESSIVE STRESSES WERE PRODUCED AS THE CYCLE WAS COMPLETED FORMING A CLOSED HYSTERESIS LOOP, CHARACTERISTIC OF THESE MATERIALS, ON THE STRESS VS. TEMPERATURE CURVE. WITHIN A TYPICAL CORDWOOD WELDED MODULE WITH COMPONENT DENSITY LEVELS OF 10-30 PERCENT, THE STRESS LEVELS WERE REDUCED BY INCREASING LEVELS OF COMPONENT LOADING. THE LOW-DENSITY, MICROBALLOON-FILLED STYCAST 1090/11 EPOXY MATERIAL EXHIBITED SIGNIFICANTLY LOWER, MORE UNIFORM TENSILE AND COMPRESSIVE STRESSES THAN THE MEDIUM-DENSITY, MINERAL-FILLED HYSOL 4215/3561 (9709466, TYPE I) EPOXY MATERIAL WITHIN THIS SAME TEST CONFIGURATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-630 566 11/9 9/3 13/10
NAVY MARINE ENGINEERING LAB ANNAPOLIS MD

EFFECT OF WATER ABSORPTION ON DIMENSIONAL STABILITY OF ELECTRIC MOTOR ENCAPSULATING MATERIALS. (U)

DESCRIPTIVE NOTE: RESEARCH AND DEVELOPMENT PHASE REPT.,
MAR 66 15P TOBIN,JOHN F. ;
REPT. NO. MEL-421/65,
PROJ: S-F013 12 15,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•EPOXY PLASTICS, ENCAPSULATION), (•ENCAPSULATION, EPOXY PLASTICS), (•ELECTRIC MOTORS, ENCAPSULATION), PERFORMANCE(ENGINEERING), WATER, ABSORPTION(PHYSICAL), WINDING, DEEP SUBMERGENCE, STATISTICAL ANALYSIS, UNDERWATER EQUIPMENT, DEGRADATION, STABILITY (U)

EXPERIMENTS WITH EPOXY MATERIALS TO DETERMINE THEIR DIMENSIONAL CHANGE AS CAUSED BY WATER ABSORPTION (WHEN USED AS ENCAPSULATING MATERIALS FOR SUBMERSIBLE ELECTRIC MOTOR WINDINGS) WERE CONDUCTED WITH SUFFICIENT SAMPLE POPULATION TO ALLOW STATISTICAL ANALYSIS. THE STUDIES SHOWED THAT THE WATER ABSORPTION RATES OF THE THREE EPOXIES WERE IDENTICAL AND THAT DEEP SUBMERGENCE PRESSURES DID NOT ACCELERATE THE ABSORPTION RATE OR THE DIMENSIONAL GROWTH OF THE EPOXIES. DIMENSIONAL CHANGES DUE TO WATER ABSORPTION WERE FOUND TO BE VERY SMALL IN ALL CASES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-631 491 9/1 13/8
PHILCO CORP LANSDALE PA

LOW COST INTEGRATED CIRCUIT TECHNIQUES. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 2, 15 SEP-14 DEC 65,
APR 66 68P WAGNER,STURGER ;WALKER,MAURO
;
CONTRACT: DA-28-043-AMC-01424(E)
PROJ: 1P622001A056,
MONITOR: ECOM , 01424-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-628 618.

DESCRIPTORS: (•INTEGRATED CIRCUITS, MANUFACTURING METHODS), (•ENCAPSULATION, INTEGRATED CIRCUITS), GLASS, EVAPORTATION, DEPOSITION, CAPACITORS, PRINTED CIRCUITS, VAPOR PLATING, SILICON COMPOUNDS, DIOXIDES, MASKING, OXIDES, METALS, SILICON, VOLTAGE, CAPACITANCE, ALUMINUM, ETCHING (U)
IDENTIFIERS: SILICON DIOXIDE (U)

BOTH THE EVAPORATED AND PYROLYTIC GLASS DEPOSITION TECHNIQUES HAVE BEEN IMPROVED, RESULTING IN ENCAPSULATING DEPOSITS OF HIGHER QUALITY. THE PINHOLE PROBLEM ASSOCIATED WITH THE EVAPORATED GLASS HAS BEEN NEARLY ELIMINATED. ALSO, IMPROVED ADHERENCE HAS BEEN OBTAINED WITH THE PYROLYTICALLY DEPOSITED GLASS. GLASS DELINEATION WAS IMPROVED BY USING AN IMPROVED FIXTURE FOR EVAPORATION THROUGH A METAL MASK. SOME IMPROVEMENT WAS ALSO MADE IN THE DELINEATION OF PYROLYTICALLY DEPOSITED GLASS. IN THE WORK ON GLASS EVALUATION TECHNIQUES, A METHOD INVOLVING PRESSURIZED STEAM HAS PROVEN TO BE EFFECTIVE IN THE RELATIVE EVALUATION OF THE PASSIVATING PROPERTIES OF GLASS. ALSO, MOBILE CHARGE CONCENTRATION STUDIES WERE PERFORMED ON BOTH EVAPORATED AND PYROLYTICALLY DEPOSITED GLASS. PROBLEMS ENCOUNTERED IN METALIZATION INCLUDE INCREASED OHMIC CONTACT RESISTANCE AND POOR DELINEATION. SOME TEST MODELS HAVE BEEN PRODUCED, ALTHOUGH DEVICE AND METAL DELINEATION PROBLEMS HAVE DELAYED THE COMPLETION OF THE VEHICLES. THE VEHICLES HAVE BEEN SUBJECTED TO PRELIMINARY ELECTRICAL AND ENVIRONMENTAL EVALUATION. A PLAN FOR THE TESTING AND SPECIFICATION OF THE PRELIMINARY EXPLORATORY DEVELOPMENT MODELS WAS PREPARED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-635 183 9/1 13/8
PHILCO CORP LANSDALE PA

LOW COST INTEGRATED CIRCUIT TECHNIQUES. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 3, 15 DEC 65-14 MAR 66 (TECHNICAL).
JUL 66 44P WAGNER, STURGER ;WALKER, MAURO ;
CONTRACT: DA-28-043-AMC-01424(E),
PROJ: DA-1P6-22001-A056,
TASK: 02,
MONITOR: ECOM 01424-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-631 491.

DESCRIPTORS: (•INTEGRATED CIRCUITS, MANUFACTURING METHODS), (•ENCAPSULATION, INTEGRATED CIRCUITS), COSTS, VAPOR PLATING, GLASS, PERFORMANCE(ENGINEERING) (U)

EVALUATION STUDIES OF EVAPORATED AND VAPOR PLATED GLASS HAVE LED TO THE RECOMMENDATION THAT ONLY THE VAPOR PLATED GLASS PROCESS BE USED IN CONTINUING THE REMAINDER OF THE PROGRAM. VAPOR PLATED GLASS HAS SHOWN SUPERIOR PROPERTIES AS A DIELECTRIC AND IN MOBILE CHARGE CONTENT. AN IMPORTANT CONSIDERATION IS THE COMPATIBILITY OF VAPOR PLATED GLASS WITH EXISTING METALIZATION SYSTEMS. A NUMBER OF CONSTRUCTION METHODS HAVE BEEN EVOLVED AND PROVEN FEASIBLE, ALTHOUGH SEVERAL PROBLEMS REMAIN. HOWEVER, THE PROBLEMS ARE BASICALLY THOSE OF PROCESSING AND THUS CAPABLE OF RESOLUTION DURING FABRICATION OF THE TEST VEHICLES. CONTINUED IMPROVEMENTS IN BATCH ASSEMBLY TECHNIQUES HAVE LED TO MORE REPRODUCIBLE AND BETTER DEFINED SOLDER JOINTS. FURTHER ELECTRICAL EVALUATIONS HAVE BEEN MADE OF DEVICES TO DETERMINE THE EFFECTS OF GLASSING. THESE EVALUATIONS HAVE ALSO EVIDENCED THE SUPERIORITY OF VAPOR PLATED GLASS. AN ERROR IN ONE OF THE MASKS PROVED TO BE RESPONSIBLE FOR A SATURATION VOLTAGE PROBLEM. A SPECIFICATION QUESTION HAS ARISEN BECAUSE OF THE RATHER WIDE RANGE OF LEAKAGE CURRENTS RESULTING FROM GOLD DOPING. THIS LEAKAGE CURRENT VARIATION MADE THE TEST VEHICLES WHICH WERE CONSTRUCTED UNSATISFACTORY FOR ENVIRONMENTAL TESTING. A REVISED APPROACH TO THE FINAL EXPLORATORY DEVELOPMENT MODELS IS RECOMMENDED TO PERMIT EMPHASIS ON THE CONSTRUCTION TECHNIQUES WHICH UTILIZE VAPOR PLATED GLASS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-646 915 11/9 9/3
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB

THE IMPROVEMENT OF ENCAPSULATING FOAMS AND QUALITY ASSURANCE OF POTTING PLASTIC. (U)

DESCRIPTIVE NOTE: TECHNICAL MEMO.,
AUG 66 39P WINCKLER,G. A. F. ;EVANS,R. C.
;
REPT. NO. TG-817
CONTRACT: NOW-62-0604
MONITOR: IDEP 501.32.19.45-56-01

UNCLASSIFIED REPORT

DESCRIPTORS: (•EXPANDED PLASTICS, •ENCAPSULATION), (•EMBEDDING SUBSTANCES, TEST METHODS), CIRCUITS, DAMAGE, PRESSURE, VISCOSITY, HARDENING, CATALYSTS, QUALITY CONTROL, DIELECTRIC PROPERTIES, RESISTANCE(ELECTRICAL), DENSITY, INSTRUCTION MANUALS (U)

PLASTIC FOAMS USED FOR ENCAPSULATING ELECTRONIC CIRCUITS MAY, DURING THEIR FORMATION, EXERT SUFFICIENT PRESSURES TO DAMAGE COMPONENTS AND CONNECTIVE WIRING. THIS PROBABLY CAUSED BY THE INCREASING VISCOSITY OF THE PLASTIC WHILE GAS IS STILL BEING GENERATED. THE DANGER MAY BE ALLEVIATED BY ALTERING THE FORMULATION CHEMICALLY SO THAT GAS GENERATION IS COMPLETED BEFORE THE PLASTIC BEGINS TO HARDEN. THE CONSEQUENCES WHICH WOULD RESULT FROM THE USE OF A MISLABELLED OR SUBSTANDARD CAN OF POTTING PLASTIC IN FLIGHT HARDWARE ARE SO SERIOUS THAT EACH CAN MUST BE INDIVIDUALLY TESTED TO ELIMINATE THAT POSSIBILITY. THIS MAY READILY BE ACCOMPLISHED BY CASTING A TEST DISK AND THEN MEASURING ITS DIELECTRIC CONSTANT, VOLUME RESISTIVITY, SURFACE RESISTIVITY AND DENSITY. THE ELECTRICAL TESTING CAN BE PERFORMED IN LESS THAN TEN MINUTES AND IS, THEREFORE, FEASIBLE AS A STANDARD QUALITY ASSURANCE PROCEDURE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-648 420 13/8 11/9 9/3
PLASTICS TECHNICAL EVALUATION CENTER DOVER N J

ENCAPSULATION OF ELECTRONIC PARTS IN PLASTICS: A REVIEW, (U)

FEB 67 67P MOLZON,ARNOLD E. ;
REPT. NO. PLASTEC-29

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTRONIC EQUIPMENT, ENCAPSULATION), (*ENCAPSULATION, PLASTICS), COATINGS, FOAMS, EMBEDDING SUBSTANCES, POLYMERS, CASTING, MATERIAL FORMING, MOLDING, THERMAL PROPERTIES (U)

THE ADVANCES AND TRENDS IN THE PLASTICS ENCAPSULATION OF ELECTRONIC PARTS AND CIRCUITS ARE REVIEWED. IN LESS THAN 20 YEARS THIS INDUSTRY HAS DEVELOPED INTO A HIGH PRODUCTION OPERATION. INCLUDED IN THIS REPORT ARE: TYPES OF PLASTICS USED, MATERIAL REQUIREMENTS AND MATERIAL CONSUMPTION. KNOWN MATERIAL SUPPLIERS AND EQUIPMENT SUPPLIERS ARE LISTED AND THEIR PRODUCTS IDENTIFIED. ALSO TABULATED ARE 47 PERTINENT SPECIFICATIONS, 111 CONTRACTS (WITH REPORTS), AND 53 GOVERNMENT LABORATORY REPORTS. THESE REFLECT THE MATERIALS RESEARCH AND DEVELOPMENT IN THE DEPARTMENT OF DEFENSE, IN NASA, AND IN INDUSTRY. THE AVAILABILITY OF INFORMATION IS ALSO DISCUSSED. THE REPORT CONTAINS A BIBLIOGRAPHY OF 207 ITEMS ON ENCAPSULATION. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-660 349 9/1 14/4
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

PRELIMINARY INVESTIGATION OF PLASTIC ENCAPSULATED TRANSISTORS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
SEP 67 17P NAKIM,E. B. ;CANEPA,R. ;
REPT. NO. ECOM-2879
PROJ: DA-1H6-22001-A-056
TASK: 1H6-22001-A-056-01-14

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, ENCAPSULATION), PERFORMANCE(ENGINEERING), PLASTICS, RELIABILITY(ELECTRONICS), ENVIRONMENTAL TESTS, EPOXY PLASTICS, SILICONE PLASTICS (U)

AN EVALUATION OF EPOXY AND SILICONE TRANSISTOR PACKAGES WAS CARRIED OUT ON SEVEN DEVICE TYPES. ALL PACKAGES APPEARED FAVORABLE UNDER STANDARD MIL TESTS BELOW 130C. HOWEVER, A NEW REALISTIC ENVIRONMENTAL TEST HAS BEEN DEVISED WHICH APPEARS TO DETECT POTENTIALLY UNRELIABLE DEVICES IN LESS THAN 500 HOURS. THE RESULTS FROM THIS TEST INDICATE THAT SILICONE PACKAGES ARE GENERALLY MORE DESIRABLE THAN EPOXY. HOWEVER, THIS CAN VARY BETWEEN MANUFACTURERS AND SOME EPOXY UNITS HAVE BEEN FOUND TO BE AS STABLE AS SILICONE, DEPENDING ON THE MANUFACTURER. RESULTS OF TESTS ARE DISCUSSED AS WELL AS VARIOUS PROBLEM AREAS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-669 850 9/1
ITT SEMICONDUCTOR PRODUCTS LABS PALO ALTO CALIF

FOUR-LAYER DIODE DEVELOPMENT PROGRAM. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
APR 68 74P SCARLETT,ROBERT M. ;
CONTRACT: AF 30(602)-4045
PROJ: AF-5573
MONITOR: RADC TR-68-136

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTRONIC SWITCHES, DIODES(SEMICONDUCTOR)), (*DIODES(SEMICONDUCTOR), MANUFACTURING METHODS), MODULATORS, RELIABILITY(ELECTRONICS), VOLTAGE, FAILURE(ELECTRONICS), THERMAL STABILITY, LEAKAGE(ELECTRICAL), SILICON, BORON, DIFFUSION, SURFACE PROPERTIES, ENCAPSULATION (U)

THIS EFFORT IS THE CULMINATION OF SEVERAL YEARS WORK TO IMPROVE AND DEMONSTRATE THE FOUR-LAYER DIODE IN HIGH POWER SWITCH SERVICE. THE FABRICATION OF THE DEVICE, ITS CHARACTERISTICS AND AN EVALUATION OF PERFORMANCE OF THE DEVICE IN A HIGH VOLTAGE HIGH CURRENT ENVIRONMENT IS DISCUSSED. SEVERAL DEVICE PROBLEMS BECAME EVIDENT DURING THIS EFFORT AND ARE CHARACTERIZED IN THE TEXT. THE FAILURE RATES, THERMAL DISSIPATION PROBLEMS, VOLTAGE DISTRIBUTION, REPETITION RATE LIMITATIONS AND GENERAL DEVICE BEHAVIOR ARE THOROUGHLY DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-671 797 9/5
NAVAL AMMUNITION DEPOT CRANE IND

MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS. (U)

JUL 68 222P
REPT. NO. NAD-CR-MICRO-NOTES-24
MONITOR: IDEP 515.00.00.00-X9-10

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SPONSORED BY NAVAL AIR SYSTEMS COMMAND, WASHINGTON, D.C. AND NAVAL ELECTRONICS SYSTEM COMMAND, WASHINGTON, D.C. SEE ALSO AD-667 719.

DESCRIPTORS: (*NAVAL EQUIPMENT, *MICROMINIATURIZATION(ELECTRONICS)), (*INTEGRATED CIRCUITS, TESTS), RADIO RECEIVERS, FREQUENCY SHIFT CONVERTERS, RADIATION DAMAGE, GATES(CIRCUITS), LOGIC CIRCUITS, SWITCHING CIRCUITS, RELAXATION OSCILLATORS, AMPLIFIERS, PERFORMANCE(ENGINEERING), SEMICONDUCTOR DEVICES, ENCAPSULATION (U)

CONTENTS INCLUDE: MICROELECTRONICS FSK RECEIVER; EVALUATION OF DIGITAL UNITS; EVALUATION OF ANALOG UNITS; PLASTIC ENCAPSULATED SEMICONDUCTOR DEVICES AND MICROCIRCUITS; INTRODUCTION TO RADIATION EFFECTS IN INTEGRATED CIRCUITS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-689 224 9/5
ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y

FAILURE MECHANISMS IN PLASTIC ENCAPSULATED MICROCIRCUITS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 69 34P TAMBURRINO,ALFRED L. ;
KAPFER,VINCENT C. ;
REPT. NO. RADC-TR-69-111
PROJ: AF-5519
TASK: 551906
MONITOR: IDEP 515.00.00.00-F9-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*INTEGRATED CIRCUITS, RELIABILITY(ELECTRONICS)), TEST METHODS, ENCAPSULATION, EPOXY PLASTICS, PHENOLIC PLASTICS, SILICONE PLASTICS, THERMAL STRESSES, SALT SPRAY TESTS, LIQUID IMMERSION TESTS, STRESSES, CORROSION, ALUMINUM ALLOYS, FAILURE(MECHANICS) (U)

THIS PAPER DEALS WITH THE QUESTION OF MILITARY ACCEPTANCE OF MICROCIRCUITS ENCAPSULATED IN PLASTIC MATERIALS. A DISCUSSION OF MILITARY APPLICATIONS AND REQUIREMENTS AND THEIR RELATION TO DEVICE QUALIFICATION TESTING AND SCREENING IS GIVEN. IT IS POINTED OUT THAT QUALIFICATION TESTS ARE BASED NEITHER UPON ABSOLUTE MINIMUM STANDARDS NOR VALIDLY DERIVED ACCELERATION FACTORS, BUT ON EXPERIENCE WITH SIMILAR DEVICES, AND KNOWLEDGE OF THE EXPECTED CAPABILITIES OF GOOD DEVICES. EPOXY, PHENOLIC, AND SILICONE ENCAPSULATED MICROCIRCUITS HAVE BEEN SUBJECTED TO A VARIETY OF HIGH STRESS TESTS AND FOUR BASIC TYPES OF FAILURES OBSERVED: EXTERNAL SURFACE CONDUCTION, INTERNAL (SILICON CHIP) SURFACE EFFECTS, ALUMINUM METALLIZATION CORROSION, AND BOND BREAKAGE DUE TO THERMAL MISMATCH. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-690 445 9/3
NAVAL AMMUNITION DEPOT CRANE IND

MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS. (U)

JUL 69 131P
REPT. NO. NAD-CR-MICRO-NOTES-28

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE; SPONSORED BY NAVAL AIR SYSTEMS COMMAND, WASHINGTON, D. C., AND NAVAL ELECTRONICS SYSTEM COMMAND, WASHINGTON, D. C.

DESCRIPTORS: (•NAVAL EQUIPMENT, •MICROMINIATURIZATION(ELECTRONICS)), (•INTEGRATED CIRCUITS, NAVAL RESEARCH), SEMICONDUCTOR DEVICES, ENCAPSULATION, LOGIC CIRCUITS, TABLES, ENVIRONMENTAL TESTS, ION BOMBARDMENT, DOPING, GATES(CIRCUITS), RELIABILITY(ELECTRONICS) (U)
IDENTIFIERS: LSIC(LARGE SCALE INTEGRATED CIRCUITS), LARGE SCALE INTEGRATED CIRCUITS (U)

THE REPORT DISCUSSES THE RESULTS OF A JOINT EFFORT TO DISSEMINATE INFORMATION ON EVALUATION, APPLICATION, AVAILABILITY, RESEARCH AND DEVELOPMENT, AND STANDARDIZATION ACTIVITY PERTAINING TO STATE-OF-THE-ART MICROELECTRONIC CIRCUITS, DEVICES, AND MATERIALS, WITH A VIEW TOWARD AVOIDING DUPLICATION OF EFFORT AND MAKING MAXIMUM USE OF TECHNICAL RESOURCES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-703 292 9/5
GENERAL MOTORS CORP KOKOMO IND DELCO RADIO DIV

RELIABILITY EVALUATION OF PLASTIC INTEGRATED CIRCUITS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT. 9 JAN-9 NOV 69;
FEB 70 84P BEVINGTON,JOHN R. ;LITTLE, DAVID R. ;
CONTRACT: F30602-69-C-0154
PROJ: AF-5519
TASK: 551906
MONITOR: RADC,IDEP TR-69-451,515.00.00.00-F9-07

UNCLASSIFIED REPORT

DESCRIPTORS: (*INTEGRATED CIRCUITS, RELIABILITY(ELECTRONICS)), (*ENCAPSULATION, INTEGRATED CIRCUITS), PLASTICS, MOISTUREPROOFING, THERMAL STRESSES, FAILURE(MECHANICS) (U)

INSUFFICIENT DATA EXISTS WITH RESPECT TO THE LONG TERM STABILITY OF PLASTIC-ENCAPSULATED MICROCIRCUITS. OF SPECIAL INTEREST IS THE DEGREE OF SUSCEPTIBILITY OF THESE PLASTIC PACKAGES TO SUCH ENVIRONMENTAL STRESSES AS MOISTURE RESISTANCE (WITH AND WITHOUT BIAS) AND THERMAL SHOCK. THE OBJECTIVE OF THIS STUDY IS TO DETERMINE THE SUITABILITY OF REPRESENTATIVE, PRODUCTION, PLASTIC-ENCAPSULATED INTEGRATED CIRCUITS FOR MILITARY APPLICATIONS, AND TO DEVELOP METHODS AND TECHNIQUES FOR ASSESSING AND ASSURING THE RELIABILITY OF SUCH CIRCUITS. A SERIES OF SCREENS AND TESTS ARE BEING PERFORMED ON SELECTED CIRCUITS, AND DETAILED FAILURE ANALYSES ARE BEING PERFORMED TO DETERMINE THE FAILURE MODES AND MECHANISMS CHARACTERISTIC OF THE VARIOUS TYPES OF PLASTIC ENCAPSULATIONS. THE RESULTS TO DATE HAVE INDICATED CONTRASTS IN PERFORMANCE BETWEEN PACKAGE TYPES AND BETWEEN SCREENED AND UNSCREENED GROUPS, AS WELL AS SIGNIFICANT LOT-TO-LOT VARIATIONS. SEVERAL TENTATIVE CONCLUSIONS HAVE BEEN DRAWN BASED ON TEST RESULTS TO DATE; HOWEVER, FINAL CONCLUSIONS MUST AWAIT COMPLETION OF THIS STUDY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-704 925 9/5
DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA

PACKAGED CIRCUITS. VOLUME I. (U)

DESCRIPTIVE NOTE: REPORT BIBLIOGRAPHY MAR 59-FEB 69.
APR 70 159P
REPT. NO. DDC-TAS-70-39-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO VOLUME 2, AD-868 525 AND VOLUME 3, AD-508 800.

DESCRIPTORS: (*PACKAGED CIRCUITS, *BIBLIOGRAPHIES), PACKAGING, ELECTRONIC EQUIPMENT, INTEGRATED CIRCUITS, MICROMINIATURIZATION(ELECTRONICS), RELIABILITY(ELECTRONICS), MODULES(ELECTRONICS), PRINTED CIRCUITS, MOLECULAR ELECTRONICS, ELECTRIC CONNECTORS, MANUFACTURING METHODS, WELDING, SEMICONDUCTOR DEVICES, ENCAPSULATION, COMPUTERS, DATA STORAGE SYSTEMS, DATA PROCESSING SYSTEMS, COMPUTER LOGIC (U)
IDENTIFIERS: THIN FILMS (U)

SELECTIVE REFERENCES INCLUDE: COMPATIBLE TECHNIQUES FOR INTEGRATED CIRCUITRY; RESULTS OF STUDIES TO DETERMINE OPTIMUM PACKAGING TECHNIQUES FOR THE ELECTRONIC EQUIPMENT AND THE SHOCK LEVELS THAT THE DIFFERENT PACKAGES AND CERTAIN ELECTRONIC COMPONENTS COULD WITHSTAND; A SYSTEM FOR COMPUTER-AIDED SELECTION AND ASSIGNMENT OF ELECTRONIC MODULES; AN ELECTRONIC PACKAGING PROGRAM WAS INITIATED TO DEVELOP AND EVALUATE INTEGRATED CIRCUIT PACKAGING TECHNIQUES APPLICABLE TO UNMANNED SCIENTIFIC SPACECRAFT DATA SYSTEM; AND ALL ASPECTS OF MICROCIRCUIT PACKAGING ARE STUDIED AND EACH OF THE THREE BASIC APPROACHES TO THE PACKAGING OF MICROCIRCUITS ARE INVESTIGATED AND EVALUATED, NAMELY, TYPE OF CONTAINERS, GLASS AND METAL FLAT PACKAGES, AND ENCAPSULATED TYPE PACKAGES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-715 108 9/5
NAVAL AMMUNITION DEPOT CRANE IND

MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS. (U)

OCT 70 80P
REPT. NO. NAD-CR-MICRO NOTES-30

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT DATED 1 FEB 70, AD-702 751.

DESCRIPTORS: (•MICROMINIATURIZATION(ELECTRONICS), NAVAL EQUIPMENT), INTEGRATED CIRCUITS, COUNTING METHODS, CORRELATORS, STANDARDIZATION, ENCAPSULATION, PLASTICS (U)

CONTENTS: A CONTINUING REPORT ON EFFORTS TO DETERMINE THE THEORY AND METHODS REQUIRED TO FABRICATE MICROCIRCUIT ULTRA HIGH SPEED PRESCALERS; A SUMMARY OF THE WORK DONE ON DEVELOPMENT OF AN LSI CORRELATOR; MINUTES OF THE SECOND MEETING OF THE DOD/NASA COMMITTEE ON RESEARCH AND DEVELOPMENT OF PLASTIC DEVICES AND MATERIALS (WGR AND D); A COMPLETE SUMMARY OF WORK-TO-DATE DONE ON EVALUATION OF PLASTIC ENCAPSULATED INTEGRATED CIRCUITS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-715 984 9/5
ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y

STRESS INDUCED INTERMITTENT FAILURES IN ENCAPSULATED MICROCIRCUITS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
OCT 70 60P HABERER,JOHN R. ;
REPT. NO. RADC-TR-70-213
PROJ: DE-69-3

UNCLASSIFIED REPORT

DESCRIPTORS: (•INTEGRATED CIRCUITS, FAILURE(ELECTRONICS)), RELIABILITY(ELECTRONICS), ENCAPSULATION, CIRCUIT INTERCONNECTIONS (U)

THE PROBLEM OF TEMPERATURE INTERMITTENT OPERATION IN ENCAPSULATED INTEGRATED CIRCUIT IS DISCUSSED AND A TECHNIQUE IS PRESENTED WHICH HAS BEEN EFFECTIVE IN DETECTING POTENTIAL FAILURES RESULTING FROM METALLIZATION, BOND OR LEAD WIRE TEMPERATURE INTERMITTENTS. THESE ARE THE MAIN CAUSES OF INTERMITTENT OPERATION IN ENCAPSULATED MICROCIRCUITS AT PRESENT, AND THIS TECHNIQUE SHOULD LEAD TO IMPROVEMENT IN ENCAPSULATED DEVICE RELIABILITY IF IMPLEMENTED AS A SCREENING OR QUALIFICATION TEST. THE INSTRUMENTATION USED AT RADC FOR THIS TECHNIQUE, CALLED THE MONITORED THERMAL CYCLE TEST (MTC), IS PRESENTED AND A PROPOSED STANDARD TEST METHOD, BASED ON THIS TEST IS INCLUDED AS AN APPENDIX. SEVERAL REPRESENTATIVE DEVICE FAILURE ANALYSIS SUMMARIES ARE INCLUDED TO ILLUSTRATE THE CAUSE OF TYPICAL ENCAPSULATED INTEGRATED CIRCUIT INTERMITTENTS RESULTING FROM FAILURE OF THE LEAD WIRE-BOND-INTERCONNECT SYSTEM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-718 336 13/9 20/11
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA ENGINEERING DEPT (SI)

A STUDY IN TERMINAL BENDING OF UNIFORM AND ENCAPSULATED WIRE ROPE WITH LINEAR AND NON-LINEAR CONSTITUTIVE EQUATIONS, (U)

JAN 71 114P BLACK,ROBERT ;
REPT. NO. NAEC-ENG-7683
PROJ: A3405373/2008/1F32461402

UNCLASSIFIED REPORT

DESCRIPTORS: (•CABLES(MECHANICAL), BENDING), LOADING(MECHANICS), BENDING, DEFORMATION, CORDAGE, STRAIN(MECHANICS), ENCAPSULATION, ARRESTING GEAR (U)

THE REPORT DEVELOPS EQUATIONS FOR THE CALCULATION OF THE TERMINAL FORCES AND MOMENTS ABOUT A BUILT-IN END OF A WIE ROPE WHEN THE UPSTREAM END IS SUBJECTED TO A TENSILE LOAD APPLIED AT AN ANGLE MEASURED FROM THE DIRECTION TAKEN BY THE LONGITUDINAL AXIS OF THE ROPE AT THE POINT OF ATTACHMENT. SOLUTIONS FOR THESE FORCES AND MOMENTS AND THE ROPE CURVATURE ARE GIVEN ALONG THE LENGTH OF THE CABLE AND THE EFFECT OF THESE QUANTITIES UPON THE STRANDS ARE DETERMINED. THE ANALYSES ARE PRESENTED FOR WIRE ROPE LINEAR AND NONLINEAR CONSTITUTIVE EQUATIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-722 043 9/5
GENERAL MOTORS CORP KOKOMO IND DELCO ELECTRONICS DIV

RELIABILITY EVALUATION OF PLASTIC INTEGRATED CIRCUITS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 9 JAN 69-9 SEP 70, JAN 71 171P BEVINGTON,JOHN R. ;COOK, JAMES P. ;LITTLE,DAVID R. ;INGLE,L. V. ;
CONTRACT: F30602-69-C-0154
MONITOR: RADC,GIDEP TR-71-8,515.00.00.00-F9-10

UNCLASSIFIED REPORT

DESCRIPTORS: (*INTEGRATED CIRCUITS, *ENCAPSULATION), PLASTICS, RELIABILITY(ELECTRONICS), ACCEPTABILITY (U)

INSUFFICIENT INFORMATION HAS BEEN AVAILABLE WITH RESPECT TO THE LONG-TERM STABILITY OF PLASTIC-ENCAPSULATED MICROCIRCUITS. OF SPECIAL INTEREST IS THE DEGREE OF SUSCEPTIBILITY OF THESE PLASTIC PACKAGES TO SUCH ENVIRONMENTAL STRESSES AS MOISTURE RESISTANCE (WITH AND WITHOUT BIAS) AND THERMAL SHOCK. THE OBJECTIVES OF THE STUDY ARE TO DETERMINE THE SUITABILITY OF REPRESENTATIVE, PRODUCTION, PLASTIC-ENCAPSULATED INTEGRATED CIRCUITS FOR MILITARY APPLICATIONS, AND TO DEVELOP METHODS AND TECHNIQUES FOR ASSESSING AND ASSURING THE RELIABILITY OF SUCH CIRCUITS. A SERIES OF SCREENS AND TESTS WERE PERFORMED ON SELECTED CIRCUITS, AND DETAILED FAILURE ANALYSES WERE MADE TO DETERMINE THE FAILURE MODES AND MECHANISMS CHARACTERISTIC OF THE VARIOUS TYPES OF PLASTIC ENCAPSULATION. THE REPORT INCLUDES DETAILED TEST RESULTS FROM LONG-TERM TESTS AND FROM SHORT-TERM HIGHLY ACCELERATED TESTS. COMPARISONS ARE MADE BETWEEN PACKAGE TYPES UNDER THE SAME STRESS CONDITIONS, BETWEEN SCREENED AND UNSCREENED GROUPS, AND BETWEEN STANDARD AND ACCELERATED TEST RESULTS. A STRESS TO DESTRUCTION TEST PROGRAM, INCLUDING EQUIVALENT HERMETIC TYPES FOR DIRECT COMPARISON WITH PLASTIC-ENCAPSULATED DEVICES UNDER SELECTED ACCELERATED TEST CONDITIONS, WAS PERFORMED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-722 405 9/5 1/4
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF

THERMAL ANALYSIS, ADVANCED AUTOPILOT FLATPAK MODULE DESIGN RECOMMENDATIONS, (U)

DEC 67 38P HALL,J. E. ;
REPT. NO. GDC-BTD67-144
CONTRACT: AF 04(695)-710
MONITOR: SAMSO TR-71-86

UNCLASSIFIED REPORT

DESCRIPTORS: (•MODULES(ELECTRONICS), THERMAL ANALYSIS), (•AUTOMATIC PILOTS, MODULES(ELECTRONICS)), (•ENCAPSULATION, MODULES(ELECTRONICS)), DESIGN, THERMAL INSULATION, THERMAL CONDUCTIVITY, HEAT SINKS, EXPANDED PLASTICS, ISOCYANATE PLASTICS, EPOXY PLASTICS, COMPOSITE MATERIALS, COPPER (U)
IDENTIFIERS: METAL PARTICLE COMPOSITES (U)

A THERMAL MODEL OF A TYPICAL ELECTRONIC FLATPAK MODULE WAS CONSTRUCTED AND ANALYZED. POLYURETHANE FOAM AND ALUMINUM-FILLED EPOXY WERE ASSESSED FOR USE AS ENCAPSULATION MATERIALS. THE VALUE OF UTILIZING COPPER SHEETS AS HEAT CONDUCTIVE PATHS FROM HEAT GENERATORS TO THE FLATPAK FRAMES WAS ASSESSED. FROM A LARGE NUMBER OF DIGITAL COMPUTER CALCULATIONS, ACCUMULATED DATA WERE CORRELATED WITH SOME PRELIMINARY TEST DATA. WITH THIS INFORMATION, DESIGN RECOMMENDATIONS WERE MADE TO ASSIST THE FLATPAK DESIGNER. IN GENERAL, THE ECONOMICS OF MATERIAL AND FABRICATION COSTS MUST BE COMPARED, BY THE DESIGNER, WITH THERMAL CHARACTERISTICS OF THE ENCAPSULATION METHODS. TEMPERATURES ATTAINED BY CRITICAL HEAT GENERATING ELEMENTS ARE DEPENDENT UPON: (1) LOCATION RELATIVE TO THE FLATPAK FRAME, (2) LENGTH OF ELECTRICAL LEADS AND CONNECTIONS, AND (3) CONTACT RESISTANCES OF THE ELECTRICAL CONNECTIONS AND HEAT CONDUCTIVE SHEETS. RECOMMENDATIONS INCLUDE A TABULATION OF ALLOWABLE THERMAL RESISTANCE FOR EACH HEAT GENERATOR CONFIGURATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-722 448 11/3 4/2
NATIONAL CASH REGISTER CO DAYTON OHIO CAPSULAR RESEARCH AND PRODUCT DEVELOPMENT DEPT

MICROENCAPSULATED CLOUD SEEDING MATERIALS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 15 AUG 69-14 JAN 71,
FEB 71 158P ANDERSON,JERROLD L. ;
CONTRACT: F19628-70-C-0011
PROJ: AF-8620, ILIR-7-69
TASK: 862008, ILIR-7-69-01
MONITOR: AFCRL 71-0151

UNCLASSIFIED REPORT

DESCRIPTORS: (•ETHYL CELLULOSE, COATINGS), (•ARTIFICIAL PRECIPITATION, MATERIALS), (•SODIUM CHLORIDE, •ENCAPSULATION), (•UREA, ENCAPSULATION), POLYMERS, FOG, PARTICLE SIZE, PHOSPHATES, OPTICAL PROPERTIES, ADSORPTION, PRODUCTION, SCATTERING, FEASIBILITY STUDIES, POWDERS (U)
IDENTIFIERS: •CLOUD SEEDING, MICROENCAPSULATION (U)

A PROCESS WAS DEVELOPED FOR ENCAPSULATING HYGROSCOPIC, CLOUD-SEEDING AGENTS, SODIUM CHLORIDE AND UREA. THE ENCAPSULATION PROCESS INVOLVES DEPOSITING THE COATING POLYMER, ETHYLCELLULOSE, ONTO FINELY DIVIDED POWDERS USING A PHASE SEPARATION-COACERVATION TECHNIQUE. THE PROCESS PRODUCES SMALL ENCAPSULATED AGGREGATES, THE SIZE AND DISTRIBUTION OF WHICH CAN BE VARIED. ENCAPSULATED MATERIALS PREPARED BY THE PROCESS ARE UNIQUE IN THAT THEY ARE VOID, ESSENTIALLY, OF POWDER FINES. LABORATORY TESTS OF BOTH ENCAPSULATED SODIUM CHLORIDE AND UREA PROVED THE POWDERS TO BE RESISTANT TO CLUMPING AND CAKING ASSOCIATED WITH PREMATURE MOISTURE SORPTION OCCURRING DURING STORAGE AND HANDLING. THE ENCAPSULATION COATING POLYMER, ETHYLCELLULOSE, IS WATER INSOLUBLE, BUT IS PERMEABLE TO WATER VAPOR, WATER AND SOLUTES. HENCE, WATER SORPTION AND PARTICLE GROWTH PROPERTIES RESULTING FROM EXPOSURE OF THE ENCAPSULATED PARTICLES TO HUMID ATMOSPHERES ARE EFFECTED BY DIFFUSION-MASS TRANSPORT PROCESSES. LABORATORY TESTING OF ENCAPSULATED SODIUM CHLORIDE AND UREA MATERIALS IN SIMULATED WARM FOG ATMOSPHERES REVEALED WATER SORPTION CHARACTERISTICS WHICH WERE COMPARABLE TO UNENCAPSULATED PARTICLES HAVING EQUIVALENT DIMENSION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-726 018 14/2 13/8 9/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

1.5-KW SOLID-STATE POWER CYCLER. (U)

DESCRIPTIVE NOTE: RESEARCH AND DEVELOPMENT TECHNICAL REPT.,
APR 71 18P MALINOWSKI,GREGORY J. ;
REPT. NO. ECOM-3410
PROJ: DA-1-H-662705-A-056
TASK: 1-H-662705-A-05601

UNCLASSIFIED REPORT

DESCRIPTORS: (•EMBEDDING SUBSTANCES, •TEST EQUIPMENT(ELECTRONICS)), (•TRANSISTORS, ENCAPSULATION), TIMING CIRCUITS, RELAXATION OSCILLATORS, SEMICONDUCTOR DEVICES, PULSE AMPLIFIERS, THERMAL PROPERTIES (U)
IDENTIFIERS: POWER CYCLERS (U)

THE REPORT DESCRIBES THE DESIGN AND OPERATION OF A SOLID-STATE POWER CYCLER USED IN THE EVALUATION OF PLASTIC ENCAPSULATED SEMICONDUCTOR DEVICES. THE CYCLER CAN SWITCH LOADS UP TO 2.0 KW WITH A VARIABLE DUTY CYCLE. THIS REPORT ALSO SHOWS THE PERFORMANCE OF THE CYCLER AS DESIGNED AND RECOMMENDS FUTURE MODIFICATIONS FOR ADDED VERSATILITY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-727 680 6/8
ARMY NATICK LABS MASS FOOD LAB

DEVELOPMENT OF A STABLE LEAVENING SYSTEM FOR BAKERY MIXES. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 71 27P UMINA,ANTHONY ;KELLEY,NANCY ;EVERSON,THOMAS ;WESTCOTT,DONALD E. ;
REPT. NO. FL-133
PROJ: PE-728012.12
MONITOR: USA-NLABS TR-71-54-FL

UNCLASSIFIED REPORT

DESCRIPTORS: (•FOOD, STORAGE), CARBON DIOXIDE, MOISTURE, TEMPERATURE, STABILITY, SODIUM COMPOUNDS, CARBONATES, PHOSPHATES, ALUMINUM COMPOUNDS, SEPARATION, ENCAPSULATION, PACKAGING, MILITARY REQUIREMENTS (U)
IDENTIFIERS: •CAKE MIXES, CAKE MIX SHELF LIFE, SODIUM BICARBONATES, SODIUM ALUMINUM PHOSPHATES, •FOOD STORAGE (U)

IN ORDER TO PROLONG THE SHELF LIFE OF A PREPARED BAKERY MIX A LEAVENING SYSTEM WAS DESIRED WHICH WOULD PREVENT THE PREMATURE ESCAPE OF CARBON DIOXIDE DUE TO INTERACTION WITH MOISTURE IN THE PRODUCT DURING PROLONGED HIGH TEMPERATURE STORAGE. A VARIETY OF METHODS WAS TRIED WHICH WOULD PROVIDE A BARRIER BETWEEN THE SODIUM BICARBONATE AND THE LEAVENING ACID, SODIUM ALUMINUM PHOSPHATE, AND AVAILABLE MOISTURE IN THE MIX. THESE INCLUDED ENCAPSULATING THE SODIUM BICARBONATE PARTICLES WITH HYDROPHOBIC MATERIALS SUCH AS HYDROGENATED VEGETABLE OR ANIMAL OILS. THE SHORTENING PROTECTED SODIUM BICARBONATE METHOD WAS DEVELOPED INTO A TWO LAYERED BAKERY MIX, SEPARATING THE SODIUM BICARBONATE FROM THE MOISTURE CONTAINING INGREDIENTS OF THE MIX. PHYSICAL SEPARATION OF THE SODIUM BICARBONATE WAS ALSO INVESTIGATED BY PACKAGING THE SODIUM BICARBONATE IN A MOISTURE PROOF POUCH FROM WHICH IT COULD BE MIXED WITH THE REMAINING INGREDIENTS AT THE TIME OF BAKING. IT WAS FOUND THAT BOTH THE PHYSICALLY SEPARATED AND THE SHORTENING - PROTECTED SODIUM BICARBONATE IN A LAYERED MIX METHOD WERE SUCCESSFUL IN PREVENTING THE PREMATURE ESCAPE OF CARBON DIOXIDE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-729 680 8/7 20/11
BATTELLE MEMORIAL INST COLUMBUS OHIO COLUMBUS LABS

THE EFFECT OF FLUIDS AND CYCLIC LOADING ON THE ELASTIC CONSTANTS OF ROCKS. (U)

DESCRIPTIVE NOTE: SEMIANNUAL REPT. 18 DEC 70-18 JUN 71,
AUG 71 39P LA MORI,PHILLIP N. ;
CONTRACT: HC210007, ARPA ORDER-1579

UNCLASSIFIED REPORT

DESCRIPTORS: (•SEDIMENTARY ROCK, STRUCTURAL PROPERTIES), LOADING(MECHANICS), CRACKS, POROSITY, ELASTICITY, COMPRESSIVE PROPERTIES, ACOUSTIC PROPERTIES, EXPERIMENTAL DATA (U)
IDENTIFIERS: ACOUSTIC VELOCITY (U)

SIMULTANEOUS MEASUREMENTS OF ACOUSTIC VELOCITY AND LINEAR STRAIN HAVE BEEN MADE ON SAMPLES OF SALEM LIMESTONE AND BEREA SANDSTONE. CYCLIC LOADING CONDITIONS OF 0-1-0-5-0-8-0 KB WERE MADE ON THESE SAMPLES. THE RESULTS SHOW THAT THIN CRACKS HAVE A LARGE EFFECT ON ACOUSTICALLY MEASURED PROPERTIES AND LITTLE EFFECT ON LINEAR STRAIN. BOTH ROCK SAMPLES ARE QUITE POROUS AND EXHIBIT THE CRUSHING MODE OF FAILURE; AT 1.5 KB FOR THE LIMESTONE, 5 KB FOR THE SANDSTONE. THIS CRUSHING GREATLY DECREASES THE STATIC MODULUS BUT CHANGES THE ACOUSTIC MODULUS ONLY SLIGHTLY. A PECULIAR KNEE DEVELOPS IN THE VELOCITY CURVE NEAR THE PRESSURE OF THE CRUSH-UP AND APPEARS TO BE AN INDICATOR OF IT. THE RESULTS SUGGEST THAT VOLUME MEASUREMENTS OF ELASTIC CONSTANTS ARE TO BE PREFERRED TO ACOUSTIC MEASUREMENTS FOR EVALUATING EXCAVATION OF ROCK. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-729 691 13/8
SOUTHWEST RESEARCH INST SAN ANTONIO TEX

PREPARATION OF CAPSULES. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 AUG 70-31 JUL 71,
SEP 71 8P ADAMS,LEON M. ;
CONTRACT: N00014-71-C-0027
PROJ: NR-356-509, SWRI-01-2928-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENCAPSULATION, REVIEWS), POLYVINYL ALCOHOL, PREPARATION, MATERIALS (U)

A GOVERNMENT-FURNISHED MATERIAL WAS SUCCESSFULLY ENCAPSULATED, AND A NUMBER OF SMALL VIALS OF THE RESULTING CAPSULES WERE SUPPLIED TO THE OFFICE OF NAVAL RESEARCH FOR TESTING. THE BEST CAPSULE SHELL FORMULATION EVALUATED WAS PREDOMINANTLY POLY(VINYL ALCOHOL). (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO, /ZZZHT

AD-730 908 11/1
NATIONAL CASH REGISTER CO DAYTON OHIO CAPSULAR PRODUCTS RESEARCH AND DEVELOPMENT

DEVELOPMENT OF MULTIPURPOSE CAPSULAR ADHESIVE SYSTEMS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
MAY 71 60P PETERS,GAVIN H. ;SCHAAB, CARL K. ;HILBELINK,RONALD D. ;DAVIS,TERRY R. ;
CONTRACT: DAAA21-68-C-0581
MONITOR: PA TR-4215

UNCLASSIFIED REPORT

DESCRIPTORS: (*ADHESIVES, PLASTICS), EPOXY PLASTICS, POLYESTER PLASTICS, AGING(MATERIALS), ENCAPSULATION, STABILITY, UNDERWATER (U)

A UNIQUE, POLYESTER-EPOXY ADHESIVE SYSTEM WAS DEVELOPED WHICH CURES VERY RAPIDLY UPON MIXING OF ITS TWO COMPONENTS AND ADHERES TO A MULTITUDE OF SUBSTRATES UNDER VARIOUS ENVIRONMENTAL CONDITIONS. EACH OF THE TWO LIQUID ADHESIVE COMPONENTS CAN BE ENCAPSULATED TO FORM 'PSEUDO SOLIDS'. MIXING TOGETHER OF THE TWO CAPSULAR COMPONENTS INTO THE PROPER RATIO FORMS A STABLE, 'ONE CAN,' DRY POWDER ADHESIVE THAT IS EASILY ACTIVATED UPON RUPTURE OF THE CAPSULES. THIS RAPID CURING CAPSULAR ADHESIVE SYSTEM, WITH ITS IMPROVED STABILITY, HANDLING AND LOGISTICS CHARACTERISTICS DUE TO ENCAPSULATION, WAS FURTHER CHARACTERIZED DURING THE SECOND PHASE OF THE PROGRAM. CAPSULAR ADHESIVE STABILITY WAS FOUND TO BE NINE MONTHS UNDER LABORATORY CONDITIONS WITH THE EPOXY COMPONENT BEING THE LIMITING FACTOR. SEVERAL FORMULATION VARIATIONS WERE MADE THAT AFFECTED CURE TIME, BOND STRENGTH AND ADHESION PROPERTIES. ENCAPSULATION OF EACH OF THE TWO COMPONENTS WAS EASILY SCALED UP THROUGH THE PILOT-PLANT STAGE. SEVERAL MECHANICAL ADHESIVE APPLICATOR DESIGNS WERE DEVELOPED AND EVALUATED FOR THE EXTRUSION AND APPLICATION OF BOTH THE CAPSULAR ADHESIVES AND THE SAME FORMULATIONS IN THEIR LIQUID, UNENCAPSULATED FORMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-804 551 9/1 9/5
RADIO CORP OF AMERICA SOMERVILLE N J ELECTRONIC COMPONENTS AND DEVICES

TRANSISTOR, VHF, SILICON, POWER, LINEAR, 30-MHZ, 100 WATTS PEP. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 65-30 JUN 66,
DEC 66 123P ROSENZWEIG,R. ;CHANG,Z. F.
;
CONTRACT: DA-28-043-AMC-01387(E)
PROJ: DA-1E6-22001-A-056
MONITOR: ECOM 01387-F

UNCLASSIFIED REPORT

DESCRIPTORS: (•TRANSISTORS, •VERY HIGH FREQUENCY), (•POWER AMPLIFIERS, •SILICON), ELECTRIC POWER PRODUCTION, GAIN, MODULATION, DISTORTION, CAPACITANCE, ELECTRICAL IMPEDANCE, RESISTORS, STORAGE, LIFE EXPECTANCY, RADIOFREQUENCY INTERFERENCE, ENCAPSULATION, SILICONE PLASTICS (U)

THIS REPORT DESCRIBES THE WORK PERFORMED IN THE DEVELOPMENT AND FABRICATION OF A LINEAR AMPLIFIER TRANSISTOR WITH A GOAL OF 100 WATTS PEP AT 30 MEGAHERTZ WITH -30 DB INTERMODULATION DISTORTION, 15-DB POWER GAIN, AND EFFICIENCY GREATER THAN 35 PERCENT. THE TRANSISTOR STRUCTURE INCORPORATES DIFFUSED BALLAST RESISTANCE FOR SECOND-BREAKDOWN PROTECTION. A TEMPERATURE-COMPENSATING DIODE HAS BEEN PLACED INSIDE THE TRANSISTOR PACKAGE TO PROVIDE CLASS AB BIAS-POINT CONTROL. THE PACKAGE IS A UNIQUELY DESIGNED STUD PACKAGE HAVING SHORT, FLAT, LOW INDUCTANCE, ISOLATED TERMINALS. THERE ARE FOUR ISOLATED TERMINALS: THREE TERMINALS FOR THE TRANSISTOR AND ONE TERMINAL FOR THE DIODE. THE PELLET IS SEALED BY ENCAPSULATION IN A SILICON RESIN. PERFORMANCE DATA ON THE SUBMITTED FINAL SAMPLES REVEALS THAT 20 PERCENT OF THE TRANSISTORS WERE CAPABLE OF ATTAINING THE MAJOR GOAL OF 100 WATTS PEP WITH -30 DB INTERMODULATION DISTORTION. MEDIAN POWER GAIN ON SAMPLE TRANSISTORS WAS 14 DB AND COLLECTOR DIFFERENCES WERE NEAR 50 PERCENT. THE DEVICE WAS CAPABLE OF 150 WATTS DISSIPATION AT ROOM TEMPERATURE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-815 470 9/5 13/8
GENERAL DYNAMICS/POMONA CALIF

CORROSION PREVENTION/DETERIORATION CONTROL IN ELECTRONIC COMPONENTS AND ASSEMBLIES. (U)

DESCRIPTIVE NOTE: FINAL SUMMARY ENGINEERING REPT.,
66 152P SPARLING,R. H. ;
REPT. NO. CR-6-347-958-001
CONTRACT: DA-01-021-AMC-12641(Z)
PROJ: DA-1400-A019

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTRONIC EQUIPMENT, *CORROSION INHIBITION), (*RELIABILITY(ELECTRONICS), CORROSION INHIBITION), DEGRADATION, MATERIALS, PROCESSING, SELECTION, ENVIRONMENT, PROTECTIVE TREATMENTS, COATINGS, ENCAPSULATION, BONDING, SOLDERING, WELDING, PACKAGING (U)

THE PURPOSE OF THIS DOCUMENT IS TO FOCUS THE ATTENTION OF DESIGNERS ON CORROSION AND THE CONSEQUENT DEGRADATION OF RELIABILITY OF ELECTRONIC ITEMS. THE REPORT POINTS OUT DANGEROUS COMBINATIONS OF MATERIALS AND PROCESSES, EMPHASIZES THE IMPORTANCE OF PROPER SELECTION OF MATERIALS, AND PROVIDES THE DESIGNER WITH MODERN TECHNIQUES FOR PREVENTION OF DETERIORATION. THE AIM OF THIS REPORT IS NOT TO DICTATE DESIGN, BUT TO HELP THE DESIGNER MEET ENVIRONMENTAL REQUIREMENTS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-821 915 9/5 20/12
WESTERN ELECTRIC CO INC NEW YORK

MICROWAVE DIODE RESEARCH. (U)

DESCRIPTIVE NOTE: REPT. NO. 26 (FINAL), 10 JUN 65-9 JUN 67,
OCT 67 35P CICCOLELLA,D. F. ;DE LOACH,B. C. , JR.;MARINACCIO,L. P. ;MISAWA, T. ;SMITH,K. D. ;
CONTRACT: DA-28-043-AMC-01445(E)
PROJ: DA-1E6-22001-A-056
TASK: 1E6-22001-A-056-04
MONITOR: ECOM 01445-F

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH BELL TELEPHONE LABS., INC., WHIPPANY, N. J.

DESCRIPTORS: (*AVALANCHE DIODES, *MICROWAVE OSCILLATORS), MICROWAVE FREQUENCY, GERMANIUM, SILICON, ENCAPSULATION, CRYSTAL OSCILLATORS, MANUFACTURING METHODS (U)
IDENTIFIERS: *IMPATT OSCILLATORS (U)

THE WORK DESCRIBED IN THIS REPORT IS PART OF A BROAD PROGRAM OF CONTINUING THEORETICAL AND EXPERIMENTAL STUDIES TO ACHIEVE IMPROVED MICROWAVE SEMICONDUCTOR DIODES AND COMBINATION MICROWAVE DEVICES. OF IMMEDIATE PARTICULAR INTEREST IS THE RESEARCH AND DEVELOPMENT EFFORT DIRECTED TOWARD CLARIFYING THE RELATIONSHIP BETWEEN STRUCTURE AND BEHAVIOR OF AVALANCHE TRANSIT-TIME DIODE OSCILLATORS AND IMPROVING THEIR MICROWAVE PERFORMANCE. CHAPTER 1 DESCRIBES EXPERIMENTAL WORK PERFORMED IN AN EFFORT TO OBTAIN MAXIMUM MICROWAVE CW OUTPUT FROM A SINGLE ENCAPSULATION, SPECIFICALLY BY USE OF SEVERAL SMALL SILICON WAFERS MOUNTED ON A COMMON PEDESTAL. CHAPTER 2 EXPLORES, ANALYTICALLY AND BY EXPERIMENTS, THE POSSIBILITIES OF OPERATING SEVERAL AVALANCHE WAFERS IN PARALLEL FOR HIGHER POWER AND/OR HIGHER EFFICIENCY. CHAPTER 3 SUMMARIZES AND PLACES IN PERSPECTIVE THE RESULTS ACHIEVED IN TWO YEARS' WORK ON THE PRESENT CONTRACT, WHICH HAS COVERED THE EVOLUTION OF AN EXPERIMENTAL DEVICE INTO AN EFFICIENT, RUGGED MICROWAVE SOURCE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-822 016 9/5
WESTERN ELECTRIC CO INC NEW YORK

MICROWAVE DIODE RESEARCH. (U)

DESCRIPTIVE NOTE: INTERIM REPT. NO. 4, 10 SEP 66-9 MAR 67,
OCT 67 31P CICCOLELLA,D. F. ;GIBBONS, G. ;RULISON,R. L. ;
CONTRACT: DA-28-043-AMC-01445(E)
PROJ: DA-1E6-22001-A-056
TASK: 1E6-22001-A-056-04
MONITOR: ECOM 01445-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH BELL TELEPHONE LABS., INC., WHIPPANY, N J.

DESCRIPTORS: (*AVALANCHE DIODES, *MICROWAVE OSCILLATORS), THERMAL STRESSES, SILICON, ENCAPSULATION, RADIOFREQUENCY POWER, GERMANIUM, SUPERHIGH FREQUENCY, EFFICIENCY, THERMAL PROPERTIES, PACKAGING (U)
IDENTIFIERS: IMPATT(IMPACT AVALANCHE TRANSIT TIME) (U)

WORK ON THE FABRICATION AND TESTS OF IMPROVED SILICON INPATT OSCILLATORS IS DESCRIBED IN CHAPTER I. EFFORT HAS BEEN CONCENTRATED ON THE P-N DIODE STRUCTURE BECAUSE OF ADVANTAGES IN PROCESS YIELD AND IN DIODE PERFORMANCE. A NEW AND MORE RUGGED ENCAPSULATION HAS BEEN USED FOR MOST OF THE DIODES FABRICATED IN THIS PERIOD; THIS FACILITATES CIRCUIT MOUNTING AND THERMAL DESIGN. IN THIS ENCAPSULATION A SINGLE SILICON DIODE HAS PROVIDED 1500-MW CW OUTPUT POWER, AND MANY UNITS IN THE 4-TO 6-GHZ RANGE HAVE GIVEN POWER OUTPUT GREATER THAN ONE WATT. FABRICATION AND TEST RESULTS OBTAINED WITH GERMANIUM P-N IMPATT DIODES, SUPPORTED IN PART BY THE PRESENT CONTRACT, ARE REPORTED IN CHAPTER II. THIS WORK HAS RESULTED IN THE HIGHEST CW EFFICIENCY (12.1 PERCENT) SO FAR OBTAINED WITH IMPATT DEVICES, AND CW POWER OUTPUT IN EXCESS OF 500 MW AT 6 GHZ. THERMAL DISSIPATION PROBLEMS ARE MORE SEVERE WITH GERMANIUM THAN SILICON; THE AVERAGE BURNOUT TEMPERATURE APPEARS TO BE ABOUT 150 C. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-823 785 15/2
STANFORD RESEARCH INST MENLO PARK CALIF

MICROENCAPSULATION. (U)

DESCRIPTIVE NOTE: SPECIAL TECHNICAL REPT. NO. 17, APR 64-JUN 67,
JUN 67 94P BREEN,W. H. ;GIBSON,R. W. ;RADDING,S. B. ;SIRINE,G. F. ;BROWN,A. G. ;
CONTRACT: DA-18-035-AMC-122(A)
PROJ: SRI-PAU-4900
TASK: 1B522301A08101

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENCAPSULATION, *CHEMICAL WARFARE AGENTS), (*DISSEMINATION, CHEMICAL WARFARE AGENTS), (*CS AGENTS, ENCAPSULATION), POLYMERS, SOLUTIONS, POLYVINYL ALCOHOL, COATINGS, DRYING, SPRAYS, AIR, SOLVENTS, FREEZE DRYING (U)
IDENTIFIERS: MICROENCAPSULATION (U)

POTENTIAL CONTRIBUTIONS OF MICROENCAPSULATION TO DISSEMINATION SYSTEMS INCLUDE REDUCTION OF AGENT-HANDLING HAZARDS, PRESIZING, STABILIZATION BY ISOLATION, PROTECTION FROM HOSTILE ENVIRONMENTS, AND SUSTAINED RELEASE, AS WELL AS POSSIBLITIES FOR NEW SYSTEMS BASED ON IMPACTION CAPSULES OR LARGE, EXPLOSIVE-COATED, SELF-DISSEMINATING CAPSULES. IN THIS PROGRAM ENCAPSULATION OF A WIDE RANGE OF ACTIVE AND INACTIVE MATERIALS WAS CARRIED OUT USING NCR-TYPE PROCESSES TO ASSESS REAL CAPABILITIES AND LIMITATIONS FOR APPLICATIONS TO BOTH EXISTING AND NEW DISSEMINATION SYSTEMS. GENERIC PROCEDURES WERE DEVELOPED FOR ADAPTATION OF MICROENCAPSULATION TO NEW MATERIALS, PRIMARILY USING GELATIN OR POLYVINYL ALCOHOL (PVA) AS WALL MATERIALS, AND A VARIETY OF SPECIAL SAMPLES WAS PREPARED FOR EVALUATION STUDIES AT STANFORD RESEARCH INSTITUTE AND AT EDGEWOOD ARSENAL. MAJOR EFFORTS WERE DEVOTED TO PRODUCTION AND STUDY OF SUSTAINED-RELEASE INHALABLE CAPSULES, 1-10 MICROONS IN DIAMETER, PARTICULARLY IN RESPECT TO POSSIBILITIES FOR PROLONGED-EFFECT CS. CS CAPSULES WITH BOTH GELATIN AND PVA WALLS WERE PREPARED IN THIS SIZE RANGE AND CS RELEASE INTO AQUEOUS MEDIA WAS SHOWN TO BE CONTROLLABLE IN RATE OVER A RANGE TO TWO ORDERS OF MAGNITUDE LESS THAN FOR NONCAPSULAR CS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-827 272 15/2 7/4
STANFORD RESEARCH INST MENLO PARK CALIF

RESEARCH STUDIES ON THE DISSEMINATION OF SOLID AND LIQUID AGENTS. (U)

DESCRIPTIVE NOTE: FINAL REPT. APR 64-DEC 67, DEC 67 138P POPPOFF,I. G. ;THUMAN,W. C. ;
CONTRACT: DA-18-035-AMC-122(A)
PROJ: DA-1B522301A081, SRI-PAU-4900
TASK: 1B522301A08101

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL WARFARE AGENTS, DISSEMINATION), SOLIDS, LIQUIDS, AEROSOLS, EXPLOSIVE MATERIALS, ELECTROSTATICS, DETONATIONS, SHOCK WAVES, IGNITION, PYROTECHNICS, PYROLYSIS, OXIDATION, DEGRADATION, CONDENSATION, ULTRASONIC RADIATION, PNEUMATIC SYSTEMS, ENCAPSULATION, HYDROLYSIS, EQUATIONS OF STATE, ENTROPY, ATOMIZATION, POWDERS (U)
IDENTIFIERS: POINT-SOURCE DISSEMINATION (U)

THE OBJECTIVE OF THE PROGRAM WAS TO PROVIDE BASIC INFORMATION NECESSARY FOR AN OVERALL IMPROVEMENT OF CHEMICAL AGENT DISSEMINATION TECHNIQUES. STUDIES WERE MADE OF EXPLOSIVE GENERATIONS OF AEROSOLS (MECHANICS OF EXPLOSIVE PROCESSES; DETONATION, SHOCK, AND REACTION PROCESSES; IGNITION PROCESSES; COMMINUTION PROCESSES); THERMAL AND PYROTECHNIC GENERATION OF AEROSOLS (THERMAL AND PYROTECHNIC PROCESSES; PYROLYTIC AND OXIDATIVE DEGRADATION PROCESSES; CONDENSATION PROCESSES); ULTRASONIC, PNEUMATIC, AND ATOMIZATION PROCESSES; ELECTROSTATIC PHENOMENA ASSOCIATED WITH AEROSOL PRODUCTION; THE APPLICATION OF MICROENCAPSULATION TO AEROSOL GENERATION AND ENHANCEMENT; AND NATURAL AEROSOL GENERATION. A CRITICAL SUMMARY OF THE PROGRAM AND RECOMMENDATIONS FOR FUTURE WORK IS FIRST PRESENTED. THIS IS FOLLOWED BY A DISCUSSION OF ACCOMPLISHMENTS AND RECOMMENDATIONS FOR FUTURE RESEARCH IN EACH OF THE STUDY AREAS LISTED ABOVE, WITH REFERENCE TO PROGRAM REPORTS (22 SPECIAL TECHNICAL REPORTS AND 13 QUARTERLY PROGRESS REPORTS) FOR DETAILS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-838 791 9/1 13/8
NAVAL AMMUNITION DEPOT CRANE IND

MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS. (U)

AUG 68 53P
REPT. NO. NAD-CR-MICRO NOTES-25
MONITOR: IDEP 515.00.00.00-X9-11

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SPONSORED BY NAVAL AIR SYSTEMS COMMAND, WASHINGTON, D. C. AND NAVAL ELECTRONICS SYSTEM COMMAND, WASHINGTON, D. C.

DESCRIPTORS: (•NAVAL EQUIPMENT, •MICROMINIATURIZATION(ELECTRONICS)), (•SEMICONDUCTOR DEVICES, •ENCAPSULATION), RELIABILITY(ELECTRONICS), EPOXY PLASTICS, TRANSISTORS, SEMICONDUCTORS, MILITARY REQUIREMENTS, INTEGRATED CIRCUITS, PLASTIC COATINGS, REPORTS (U)

CONTENTS: RELIABILITY ASSESSMENT OF EPOXY TRANSISTORS; PRESENT RELIABILITY STATUS OF PLASTIC - ENCAPSULATED SEMICONDUCTORS AND AN EVALUATION OF THEIR POTENTIAL FOR USE IN MILITARY SYSTEMS; SUMMARY OF SIGNETICS PRESENTATION INCLUDING PROPOSED GENERAL SPECIFICATION; PLASTIC SEMICONDUCTORS; WESTINGHOUSE GOLDILOX INTEGRATED CIRCUITS OFFER MILITARY RELIABILITY IN PLASTIC PACKAGES; PLASTICS FOR SEMICONDUCTOR PACKAGING; RELIABILITY OF PLASTIC INTEGRATED CIRCUITS; G-12 REPORT ON 'PLASTIC' INTEGRATED CIRCUITS; PLASTIC/EPOXY SEMICONDUCTORS; USE OF PLASTIC ENCAPSULATED TRANSISTORS AT HAZELTINE; AN EVALUATION OF PLASTIC ENCASED SEMICONDUCTORS; SELECTION AND CONTROL OF PLASTICS FOR SEMICONDUCTOR PACKAGING; PLASTIC MICROCIRCUIT RELIABILITY; SUMMARY OF PRESENTATION ON PLASTIC ENCAPSULATED TRANSISTORS; SUMMARY OF PRESENTATION ON PLASTIC ENCAPSULATED TRANSISTORS; POSITION OF THE NAVAL APPLIED SCIENCE LABORATORY ON THE MILITARY USE OF PLASTIC ENCAPSULATED SEMICONDUCTOR DEVICES; AN R AND D PROGRAM TO DEVELOP POLYMERIC ENCAPSULANTS FOR SOLID STATE ELECTRONIC COMPONENTS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-846 071 9/1 13/8
NAVAL AMMUNITION DEPOT CRANE IND

MICRO NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS. (U)

JAN 69 82P
REPT. NO. NAD-CR-MICRO NOTES-27
MONITOR: IDEP 515.00.00.00-X9-13

UNCLASSIFIED REPORT

DESCRIPTORS: (*NAVAL EQUIPMENT, *MICROMINIATURIZATION(ELECTRONICS)), (*SEMICONDUCTOR DEVICES, *ENCAPSULATION), RELIABILITY(ELECTRONICS), EPOXY PLASTICS, TRANSISTORS, SEMICONDUCTORS, INTEGRATED CIRCUITS, PLASTIC COATINGS, REPORTS (U)
IDENTIFIERS: AN/AWS-27, METAL OXIDE SEMICONDUCTORS, AVIONICS (U)

THE REPORT IS AN EFFORT TO DISSEMINATE INFORMATION ON EVALUATION, APPLICATION, AVAILABILITY, RESEARCH AND DEVELOPMENT, AND STANDARDIZATION ACTIVITY PERTAINING TO STATE-OF-THE-ART MICROELECTRONIC CIRCUITS, DEVICES, AND MATERIALS, WITH A VIEW TOWARD AVOIDING DUPLICATION OF EFFORT AND MAKING MAXIMUM USE OF TECHNICAL RESOURCES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-849 285 11/4 20/13
MONSANTO RESEARCH CORP ST LOUIS MO

RHEOLOGY OF ROD-LIKE PARTICLES IN VISCOUS MEDIA. PART I. FORMATION OF COMPOSITES FROM SINGLE FIBERS, (U)

FEB 69 46P TAKANO,MASAHARU ;
REPT. NO. N00014-67-C-0218
CONTRACT: N00014-66-C-0218, ARPA ORDER-873
PROJ: NR-356-484

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON MONSANTO/WASHINGTON UNIV., ARPA ASSOCIATION PROJECT DEVELOPMENT OF HIGH PERFORMANCE COMPOSITES.

DESCRIPTORS: (•COMPOSITE MATERIALS, MANUFACTURING METHODS), GRAPHITE, BORON, CARBON FIBERS, FIBERS, GLASS TEXTILES, RHEOLOGY, ANISOTROPY, SCATTERING, MATHEMATICAL MODELS, ENCAPSULATION, MECHANICAL PROPERTIES, DENSITY, EPOXY PLASTICS, SOLVENTS (U)

THE TECHNIQUE DEVELOPED FOR PREPARING MOLDING COMPOUNDS OF HIGH MODULUS FIBERS BY ENCAPSULATING BUNDLES OF SHORT FIBERS WITH RESIN IS DIFFICULT TO APPLY TO INDIVIDUALLY DISPERSED FIBERS. PRELIMINARY MODEL STUDIES CARRIED OUT ON SHORT GLASS FIBERS HAVE DEMONSTRATED THAT THE CRITICAL CONCENTRATION FOR PROCESSING SINGLE FIBERS, RATHER THAN FIBER BUNDLES, IS VERY LOW IN AQUEOUS SYSTEMS, BUT CAN BE SIGNIFICANTLY INCREASED BY USE OF VISCOUS MEDIA AND HIGH RATES OF SHEAR. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-854 306 9/1
AUTONETICS ANAHEIM CALIF

INVESTIGATION OF PLASTIC EFFECTS ON SEMICONDUCTOR RELIABILITY. (U)

DESCRIPTIVE NOTE: FINAL REPT., 22 DEC 67-31 DEC 68, MAY 69 101P VALLES,A. C. ;ANDERSON,R. J. ;
REPT. NO. C8-387/501
CONTRACT: F30602-68-C-0125
PROJ: AF-5519
TASK: 551904
MONITOR: RADC,IDEP TR-69-82,742.00.00.00-F9-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, RELIABILITY(ELECTRONICS)), (*EMBEDDING SUBSTANCES, CHEMICAL CONTAMINATION), TRANSISTORS, EPOXY PLASTICS, SILICONE PLASTICS, IMPURITIES, IONS, FAILURE(ELECTRONICS), STRESSES, ENCAPSULATION (U)

THE OBJECTIVE OF THE PROGRAM WAS TO STUDY THE EFFECTS PRODUCED WHEN IONS PURPOSELY WERE INTRODUCED INTO PLASTICS AND USED ON TRANSISTORS. A MATERIALS SURVEY RESULTED IN THE SELECTION OF SEVERAL CANDIDATE HIGH PURITY EPOXY RESINS AND SEMICONDUCTOR GRADE SILICONE COATINGS. THESE PLASTICS WERE THEN SCREENED USING MECHANICAL, PHYSICAL, AND CHEMICAL TESTS. ONE EPOXY AND ONE SILICONE WERE SELECTED FOR FURTHER FUNCTIONAL TESTING AS SEMICONDUCTOR COATINGS. A METHOD WAS DEVELOPED FOR DOPING THE TWO SELECTED RESINS WITH IONS BY DISPERSING THEREIN METAL SALTS OF ORGANIC ACIDS OR ORGANO-METALLIC COMPOUNDS. DOPANTS WERE ORGANIC SALTS OF SODIUM, MAGNESIUM, ZINC, OR AN ORGANO-METALLIC COMPOUND CONTAINING CHLORIDE IONS. THE DOPED PLASTICS WERE THEN APPLIED AND CURED OVER TEST NPN TRANSISTORS. THE EFFECTS OF EACH ION ON THE TRANSISTOR PARAMETERS WERE ASCERTAINED AFTER SUBJECTING THE DEVICES TO ELEVATED TEMPERATURE-REVERSE BIAS AND HIGH HUMIDITY REVERSE BIAS STRESSES. (AUTHOR) (U)

CORPORATE AUTHOR - MONITORING AGENCY

*AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

* * *

AFCRL-71-0151
MICROENCAPSULATED CLOUD SEEDING MATERIALS.
AD-722 448

*AIR FORCE OFFICE OF SCIENTIFIC RESEARCH ARLINGTON VA

* * *

AFOSR-1001
ANALOG COMPUTER RESEARCH INTO THE ENERGY-EXCHANGE BETWEEN GASES AND SOLIDS.
AD-605 159

*AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX

* * *

AFWL-TR-64-167
ENCAPSULATION OF VIRUSES.
AD-620 933

*ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

* * *

ECOM-01387-F
TRANSISTOR, VHF, SILICON, POWER, LINEAR, 30-MHZ, 100 WATTS PEP.
AD-804 551

* * *

ECOM-01424-2
LOW COST INTEGRATED CIRCUIT TECHNIQUES.
AD-631 491

* * *

ECOM-01424-3
LOW COST INTEGRATED CIRCUIT TECHNIQUES.
AD-635 183

* * *

ECOM-01445-F
MICROWAVE DIODE RESEARCH.
AD-821 915

* * *

ECOM-01445-4
MICROWAVE DIODE RESEARCH.
AD-822 016

* * *

ECOM-01524-4
RESISTORS FOR MICROPOWER CIRCUITS.
AD-489 906

* * *

ECOM-2879
PRELIMINARY INVESTIGATION OF PLASTIC ENCAPSULATED TRANSISTORS.
AD-660 349

* * *

ECOM-3410
1.5-KW SOLID-STATE POWER CYCLER.
AD-726 018

*ARMY ELECTRONICS LABS FORT MONMOUTH N J

* * *

ER E 1101
ENCAPSULATING RESINS AND POTTING COMPOUNDS
AD-096 112

*ARMY NATICK LABS MASS FOOD LAB

* * *

FL-133
DEVELOPMENT OF A STABLE LEAVENING SYSTEM FOR BAKERY MIXES.
(USA-NLABS-TR-71-54-FL)
AD-727 680

*ARMY NATICK LABS MASS

* * *

USA-NLABS-TR-71-54-FL
DEVELOPMENT OF A STABLE LEAVENING SYSTEM FOR BAKERY MIXES.
AD-727 680

*AUTONETICS ANAHEIM CALIF

* * *

C8-387/501
INVESTIGATION OF PLASTIC EFFECTS ON SEMICONDUCTOR RELIABILITY.
(RADC-TR-68-82)
AD-854 306

*BATTELLE MEMORIAL INST COLUMBUS OHIO COLUMBUS LABS

* * *

THE EFFECT OF FLUIDS AND CYCLIC

LOADING ON THE ELASTIC CONSTANTS OF ROCKS.
AD-729 680

*BELL TELEPHONE LABS INC WHIPPANY N J
* * *
ENGINEERING SERVICES ON TRANSISTORS
AD-261 938

*BUREAU OF NAVAL WEAPONS WASHINGTON D C
* * *
NAVWEPS-7604
EFFECT OF PROCESS VARIABLES ON THE DIMENSIONS AND QUALITY OF EXTRUSION-COATED PROPELLANT GRAINS
AD-255 962

*CLEVITE TRANSISTOR PRODUCTS WALTHAM MASS
* * *
PRODUCTION ENGINEERING MEASURE FOR THE IMPROVEMENT OF GERMANIUM ALLOY POWER TRANSISTORS.
AD-604 196

*DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA
* * *
DDC-TAS-70-39-1
PACKAGED CIRCUITS. VOLUME I.
AD-704 925

*DEPUTY COMMANDER AEROSPACE SYSTEMS INGLEWOOD CALIF
* * *
DCAS-TDR62 5
CRYSTAL GROWTH AND CRYSTALLOGRAPHY. A LITERATURE SURVEY
AD-274 642
* * *
TDR62 5
CRYSTAL GROWTH AND CRYSTALLOGRAPHY. A LITERATURE SURVEY
(DCAS-TDR62 5)
AD-274 642

*DOUGLAS AIRCRAFT CO INC SANTA MONICA CALIF MISSILE AND SPACE SYSTEMS DIV
* * *
SM-48410
STRESS ANALYSIS OF ENCAPSULATION MATERIALS FOR WELDED MODULES.
AD-628 833

*ELECTRONIC SYSTEMS DIV L G HANSCOM FIELD MASS
* * *
ESD-TDR-64-630
LEAD ATTACHMENT AND ENCAPSULATION TECHNIQUES FOR THIN FILM MICROCIRCUITS.
AD-611 752

*GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF
* * *
GDC-BTD67-144
THERMAL ANALYSIS. ADVANCED AUTOPILOT FLATPAK MODULE DESIGN RECOMMENDATIONS.
(SAMSO-TR-71-86)
AD-722 405

*GENERAL DYNAMICS/POMONA CALIF
* * *
CR-6-347-958-001
CORROSION PREVENTION/DETERIORATION CONTROL IN ELECTRONIC COMPONENTS AND ASSEMBLIES.
AD-815 470

*GENERAL ELECTRIC CO SYRACUSE N Y
* * *
OPTIMIZATION OF THERMOELECTRIC ENERGY CONVERTERS
AD-265 461
* * *
OPTIMIZATION OF THERMOELECTRIC ENERGY CONVERTERS
AD-265 857

*GENERAL ELECTRIC CO UTICA N Y
* * *
RESEARCH AND DEVELOPMENT OF THERMOCOUPLE ENERGY CONVERTERS

AD-251 485

*GENERAL MOTORS CORP KOKOMO IND DELCO ELECTRONICS DIV

* * *

RELIABILITY EVALUATION OF PLASTIC INTEGRATED CIRCUITS. (RADC-TR-71-8)
AD-722 043

*GENERAL MOTORS CORP KOKOMO IND DELCO RADIO DIV

* * *

RELIABILITY EVALUATION OF PLASTIC INTEGRATED CIRCUITS. (RADC-TR-69-451)
AD-703 292

*GOVERNMENT-INDUSTRY DATA EXCHANGE PROGRAM

* * *

GIDEP-515.00.00.00-F9-10
RELIABILITY EVALUATION OF PLASTIC INTEGRATED CIRCUITS.
AD-722 043

*HARRY DIAMOND LABS WASHINGTON D C

* * *

TR-1308
LOW-LOSS STYRENE-TYPE FOAM-IN-PLACE ENCAPSULATING RESINS.
AD-628 537

*INTERAGENCY DATA EXCHANGE PROGRAM

* * *

IDEP-501.32.19.45-S6-01
THE IMPROVEMENT OF ENCAPSULATING FOAMS AND QUALITY ASSURANCE OF POTTING PLASTIC.
AD-646 915

* * *

IDEP-515.00.00.00-F9-01
FAILURE MECHANISMS IN PLASTIC ENCAPSULATED MICROCIRCUITS.
AD-689 224

* * *

IDEP-515.00.00.00-X9-10
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
AD-571 797

* * *

IDEP-515.00.00.00-X9-11
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
AD-838 791

* * *

IDEP-515.00.00.00-X9-13
MICRO NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
AD-846 071

* * *

IDEP-742.00.00.00-F9-01
INVESTIGATION OF PLASTIC EFFECTS ON SEMICONDUCTOR RELIABILITY.
AD-854 306

*INTERAGENCY DATA EXCHANGE PROGRAM

* * *

IDEP-515.00.00.00-F9-07
RELIABILITY EVALUATION OF PLASTIC INTEGRATED CIRCUITS.
AD-703 292

*ITT SEMICONDUCTOR PRODUCTS LABS PALO ALTO CALIF

* * *

FOUR-LAYER DIODE DEVELOPMENT PROGRAM. (RADC-TR-68-136)
AD-669 850

*JOHNS HOPKINS UNIV BALTIMORE MD

* * *

ANALOG COMPUTER RESEARCH INTO THE ENERGY-EXCHANGE BETWEEN GASES AND SOLIDS. (AFOSR-1001)
AD-605 159

*JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB

* * *

TG-817
THE IMPROVEMENT OF ENCAPSULATING FOAMS AND QUALITY ASSURANCE OF POTTING PLASTIC. (IDEP-501.32.19.45-S6-01)
AD-646 915

*LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

* * *

MRI267 01
VACUUM DE-GASSING OF ENCAPSULANTS,
AD-412 282

* * *

SB 61 50
ENCAPSULATING, POTTING, AND EMBEDDING MATERIALS FOR ELECTRONIC COMPONENTS AND MODULES. AN ANNOTATED BIBLIOGRAPHY
AD-265 866

* * *

SB62 433 80 62 28
INSPECTING AND TESTING OF EMBEDDING MATERIALS AND COMPONENTS OF ELECTRICAL MODULES BEFORE, DURING AND AFTER ASSEMBLY: A PARTIALLY ANNOTATED BIBLIOGRAPHY
AD-296 356

*MCDONNELL AIRCRAFT CORP ST LOUIS MO

* * *

9354
ELECTRICAL POTTING COMPOUNDS - SURFACE AND VOLUME RESISTIVITY AT ELEVATED TEMPERATURES FOR PROTRACTED TIMES (PHASE II: ELECTRICAL TESTS)
AD-295 538

*MITRE CORP BEDFORD MASS

* * *

W-6353
LEAD ATTACHMENT AND ENCAPSULATION TECHNIQUES FOR THIN FILM MICROCIRCUITS,
(ESD-TDR-64-630)
AD-611 752

*MONSANTO RESEARCH CORP ST LOUIS MO

* * *

N00014-67-C-0218
RHEOLOGY OF ROD-LIKE PARTICLES IN VISCOUS MEDIA. PART I. FORMATION OF COMPOSITES FROM SINGLE FIBERS,
AD-849 285

*MOTOROLA INC SCOTTSDALE ARIZ

* * *

4003
MINIATURE THIN FILM INDUCTORS (MODIFICATION NO. 2).
AD-602 270

*NATIONAL CASH REGISTER CO DAYTON OHIO CAPSULAR PRODUCTS RESEARCH AND DEVELOPMENT

* * *

DEVELOPMENT OF MULTIPURPOSE CAPSULAR ADHESIVE SYSTEMS.
(PA-TR-4215)
AD-730 908

*NATIONAL CASH REGISTER CO. DAYTON OHIO CAPSULAR RESEARCH AND PRODUCT DEVELOPMENT DEPT

* * *

ENCAPSULATION OF VIRUSES.
(AFWL-TR-64-167)
AD-620 933

* * *

MICROENCAPSULATED CLOUD SEEDING MATERIALS.
(AFCRL-71-0151)
AD-722 443

*NATIONAL CASH REGISTER CO DAYTON OHIO

* * *

A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID ROCKET FUEL
AD-265 894

* * *

A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID ROCKET FUEL
AD-265 895

* * *

A STUDY OF THE ENCAPSULATION OF HIGH ENERGY SUBSTANCES.
AD-601 772

*NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA ENGINEERING DEPT (SI)

* * *

NAEC-ENG-7683
A STUDY IN TERMINAL BENDING OF UNIFORM AND ENCAPSULATED WIRE ROPE

WITH LINEAR AND NON-LINEAR CONSTITUTIVE EQUATIONS,
AD-718 336

*NAVAL AMMUNITION DEPOT CRANE IND

* * *

NAD-CR-MICRO-NOTES-24
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
(IDEP-515.00.00.00-X9-10)
AD-671 797

* * *

NAD-CR-MICRO NOTES-25
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
(IDEP-515.00.00.00-X9-11)

AD-838 791

* * *

NAD-CR-MICRO NOTES-27
MICRO NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
(IDEP-515.00.00.00-X9-13)
AD-846 071

* * *

NAD-CR-MICRO-NOTES-28
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
AD-690 445

* * *

NAD-CR-MICRO NOTES-30
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
AD-715 108

*NAVAL BOILER AND TURBINE LAB PHILADELPHIA PA

* * *

EVALUATION OF HIGH TEMPERATURE INSTRUMENTATION FOR DYNAMIC ANALYSIS. ENCAPSULATED STRAIN GAGE INSTALLATION FOR USE IN STEAM ENVIRONMENT,
AD-432 229

*NAVAL ORDNANCE TEST STATION CHINA LAKE CALIF

* * *

TP 2597
EFFECT OF PROCESS VARIABLES ON THE DIMENSIONS AND QUALITY OF EXTRUSION-COATED PROPELLANT GRAINS (NAVWEPS-7604)
AD-255 962

*NAVAL RESEARCH LAB WASHINGTON D C

* * *

NRL-MR-1481
ENCAPSULATION TECHNIQUES FOR NRL IRRADIATION EFFECTS STUDIES.
AD-430 751

*NAVY MARINE ENGINEERING LAB ANNAPOLIS MD

* * *

MEL-421/65
EFFECT OF WATER ABSORPTION ON DIMENSIONAL STABILITY OF ELECTRIC MOTOR ENCAPSULATING MATERIALS.
AD-630 566

*PHILCO CORP LANSDALE PA

* * *

PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT.
AD-433 654

* * *

LOW COST INTEGRATED CIRCUIT TECHNIQUES.
(ECOM-01424-2)
AD-631 491

* * *

LOW COST INTEGRATED CIRCUIT TECHNIQUES.
(ECOM-01424-3)
AD-635 183

* * *

PHILCO R-506
RESEARCH AND DEVELOPMENT LOW COST INTEGRATED CIRCUIT TECHNIQUES.
AD-628 618

* * *

R 232 1
PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT
AD-286 907

*PICATINNY ARSENAL DOVER N J

AMMUNITION ENGINEERING DIRECTORATE

* * *

AED-TM-1308
ENCAPSULATING PROPELLANTS BY MEANS OF ULTRASONIC WELDING.
AD-427 412

*PICATINNY ARSENAL DOVER N J

* * *

PA-TR-4215
DEVELOPMENT OF MULTIPURPOSE CAPSULAR ADHESIVE SYSTEMS.
AD-730 908

*PLASTICS TECHNICAL EVALUATION CENTER DOVER N J

* * *

PLASTEC-29
ENCAPSULATION OF ELECTRONIC PARTS IN PLASTICS: A REVIEW.
AD-648 420

*RADIO CORP OF AMERICA SOMERVILLE N J

* * *

PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON PLANAR EPITAXIAL TRANSISTOR. VOLUME. I.
AD-435 114

*RADIO CORP OF AMERICA SOMERVILLE N J ELECTRONIC COMPONENTS AND DEVICES

* * *

TRANSISTOR, VHF, SILICON, POWER, LINEAR, 30-MHZ, 100 WATTS PEP.
(ECOM-01387-F)
AD-804 551

*ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y

* * *

RADC-TR-65-291
RELIABILITY ANALYSIS OF X-BAND TUNNEL DIODES.
AD-625 956

* * *

RADC-TR-68-136
FOUR-LAYER DIODE DEVELOPMENT PROGRAM.
AD-669 850

* * *

RADC-TR-69-82
INVESTIGATION OF PLASTIC EFFECTS ON SEMICONDUCTOR RELIABILITY.
AD-854 306

* * *

RADC-TR-69-111
FAILURE MECHANISMS IN PLASTIC ENCAPSULATED MICROCIRCUITS.
(IDEP-515.00.00.00-F9-01)
AD-689 224

* * *

RADC-TR-69-451
RELIABILITY EVALUATION OF PLASTIC INTEGRATED CIRCUITS.
AD-703 292

* * *

RADC-TR-70-213
STRESS INDUCED INTERMITTENT FAILURES IN ENCAPSULATED MICROCIRCUITS.
AD-715 984

* * *

RADC-TR-71-8
RELIABILITY EVALUATION OF PLASTIC INTEGRATED CIRCUITS.
AD-722 043

*SOUTHWEST RESEARCH INST SAN ANTONIO TEX

* * *

PREPARATION OF CAPSULES.
AD-729 691

* * *

TDR62 53
ENCAPSULATION OF FOODS
(6570 AMRL-TDR62 53)
AD-284 005

*SPACE AND MISSILE SYSTEMS ORGANIZATION LOS ANGELES AIR FORCE STATION CALIF

* * *

SAMSO-TR-71-86
THERMAL ANALYSIS. ADVANCED AUTOPILOT FLATPAK MODULE DESIGN RECOMMENDATIONS.
AD-722 405

*SPEER CARBON CO NIAGARA FALLS N Y

* * *

R-140
RESISTORS FOR MICROPOWER CIRCUITS.
(ECOM-01524-4)
AD-489 906

* * *

SCC-24
RESISTORS FOR MICROPOWER CIRCUITS.
(ECOM-01524-4)
AD-489 906

*STANFORD RESEARCH INST MENLO PARK CALIF

* * *

ENCAPSULATED AEROSOLS
AD-255 010

* * *

ENCAPSULATED AEROSOLS
AD-260 926

* * *

ENCAPSULATED AEROSOLS
AD-265 314

* * *

ENCAPSULATED AEROSOLS
AD-283 325

* * *

MICROENCAPSULATION.
AD-823 785

* * *

RESEARCH STUDIES ON THE DISSEMINATION OF SOLID AND LIQUID AGENTS.
AD-827 272

*SYLVANIA ELECTRIC PRODUCTS INC WOBURN MASS SEMICONDUCTOR DIV

* * *

RELIABILITY ANALYSIS OF X-BAND TUNNEL DIODES.
(RADC-TR-65-291)
AD-625 956

*SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF ELECTRONIC DEFENSE LABS

* * *

EDL G220
NONCOMMUNICATIONS EXPENDABLE JAMMER INVESTIGATIONS. VOLUME 3. MECHANICAL DEVELOPMENT.
AD-443 097

* * *

VOL. 3
NONCOMMUNICATIONS EXPENDABLE JAMMER INVESTIGATIONS. VOLUME 3. MECHANICAL DEVELOPMENT.
AD-443 097

*SYNTHETIC MICA CO WEST CALDWELL N J

* * *

DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS
AD-258 395

* * *

DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS
AD-265 499

* * *

DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS
AD-266 161

*TEXAS INSTRUMENTS INC DALLAS

* * *

03 64 43
PRODUCTION ENGINEERING MEASURES TO INCREASE TRANSISTOR RELIABILITY FOR THE 2N656.
AD-602 939

*TRW SEMICONDUCTORS INC LAWNDALE CALIF

* * *

PRODUCTION ENGINEERING MEASURE RELIABILITY THRU PROCESS IMPROVEMENT
AD-294 110

*TRW SPACE TECHNOLOGY LABS LOS ANGELES CALIF

* * *

STL/TR-59-0000-09931
LOW PRESSURE ELECTRICAL DISCHARGE STUDIES.
AD-605 984

*WESTERN ELECTRIC CO INC NEW YORK

* * *

MICROWAVE DIODE RESEARCH.
(ECOM-01445-F)
AD-821 915

* * *

MICROWAVE DIODE RESEARCH.
(ECOM-01445-4)
AD-822 016

*WESTERN ELECTRIC CO INC WINSTON-SALEM N C

* * *

INDUSTRIAL PREPAREDNESS STUDY.
LACQUER FILM CAPACITORS
AD-257 829

*WESTINGHOUSE ELECTRIC CORP WASHINGTON D C

* * *

HIGH CURRENT AND HIGH VOLTAGE
SILICON CONTROLLED RECTIFIERS
AD-289 291

EFFECT OF PROCESS VARIABLES ON THE DIMENSIONS AND QUALITY OF EXTRUSION-COATED PROPELLANT GRAINS.
AD-255 962

METHODS OF AEROSOL ENCAPSULATION INCLUDED PREENCAPSULATION, COLLECTION, THEN REDISPERSION; ENCAPSULATION BY CONDENSATION AND VARIOUS COAGULATION METHODS.
AD-283 325

•COILS
METAL FILMS
MINIATURE THIN FILM INDUCTORS.
AD-602 270

•COMPOSITE MATERIALS
MANUFACTURING METHODS
RHEOLOGY OF ROD-LIKE PARTICLES IN VISCOUS MEDIA. PART I. FORMATION OF COMPOSITES FROM SINGLE FIBERS.•
AD-849 285

•CONTAINERS
ENCAPSULATING MATERIALS FOR PACKAGING FOOD FOR SPACE FLIGHTS. MATERIALS INCLUDE MOISTURE BARRIERS AND FILM FORMERS.
AD-284 005

DESIGN
TECHNIQUES AND DESIGN PHILOSOPHY FOR ENCAPSULATION OF TEST SPECIMENS FOR STUDIES OF RADIATION DAMAGE OF STEEL. (NUCLEAR REACTOR STRUCTURAL MATERIAL).
AD-430 751

•CORROSION INHIBITION
ELECTRONIC EQUIPMENT
CORROSION PREVENTION/DETERIORATION CONTROL IN ELECTRONIC COMPONENTS AND ASSEMBLIES.•
AD-815 470

•CORUNDUM
CRYSTAL GROWTH AND CRYSTALLOGRAPHY. A LITERATURE SURVEY.
AD-274 642

•CRYSTALS
CRYSTAL GROWTH AND CRYSTALLOGRAPHY. A LITERATURE SURVEY.
AD-274 642

•CS AGENTS
ENCAPSULATION
MICROENCAPSULATION.•
AD-823 785

•DIELECTRICS
DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS.
AD-265 499

•DIODES
ENGINEERING SERVICES ON TRANSISTORS.
AD-261 938

•DIODES(SEMICONDUCTOR)
MANUFACTURING METHODS
FOUR-LAYER DIODE DEVELOPMENT PROGRAM.•
AD-669 850

•DISSEMINATION
CHEMICAL WARFARE AGENTS
MICROENCAPSULATION.•
AD-823 785

•DROPS
A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID ROCKET FUEL.
AD-265 894

•ELECTRIC CONNECTORS
INTEGRATED CIRCUITS
RESEARCH AND DEVELOPMENT LOW COST INTEGRATED CIRCUIT TECHNIQUES.
AD-628 618

•ELECTRIC DISCHARGES
HIGH ALTITUDE
LOW-PRESSURE ELECTRICAL DISCHARGE STUDIES WITH REFERENCE TO

AD-265 894

ENCAPSULATION
ENCAPSULATION OF LIQUID ROCKET PROPELLANTS.
AD-601 772

•MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURE TO INCREASE THE RELIABILITY FOR THE JET ETCH TRANSISTOR TYPE 2N501A. MAXIMUM OPERATING FAILURE RATE OF 0.01%/1000 HR AT A 90% CONFIDENCE LEVEL AT 25 C.
AD-286 907
PRODUCTION ENGINEERING MEASURE RELIABILITY THRU PROCESS IMPROVEMENT.
AD-294 110

TRANSISTORS
PRODUCTION ENGINEERING MEASURE FOR THE IMPROVEMENT OF GERMANIUM ALLOY POWER TRANSISTORS.
AD-604 196

•METHYL HYDRAZINES
A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID ROCKET FUEL.
AD-265 894

•MICA
DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS.
AD-258 395
DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS.
AD-265 499
DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS.
AD-266 161

•MICROMINIATURIZATION (ELECTRONICS)
ELECTRIC CONNECTORS
LEAD ATTACHMENT AND ENCAPSULATION TECHNIQUES FOR THIN FILM MICROCIRCUITS.
AD-601 752

•MICROMINIATURIZATION(ELECTRONICS)
NAVAL EQUIPMENT
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
AD-671 797
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
AD-690 445
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
AD-715 108
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
AD-838 791
MICRO NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
AD-846 071

•MICROWAVE OSCILLATORS
AVALANCHE DIODES
MICROWAVE DIODE RESEARCH.
AD-821 915
MICROWAVE DIODE RESEARCH.
AD-822 016

•MINIATURE ELECTRONIC EQUIPMENT
(COILS
MINIATURE THIN FILM INDUCTORS.
AD-602 270

•MODULES (ELECTRONIC)
DEGASIFICATION
VACUUM DE-GASSING OF ENCAPSULANTS.
AD-412 282

•MODULES(ELECTRONICS)
THERMAL ANALYSIS
THERMAL ANALYSIS. ADVANCED AUTOPILOT FLATPAK MODULE DESIGN RECOMMENDATIONS.
AD-722 405

PRODUCTION ENGINEERING MEASURES TO INCREASE TRANSISTOR RELIABILITY FOR THE 2N696.
AD-602 939

•RADIO JAMMING
LANDING IMPACT
NONCOMMUNICATIONS EXPENDABLE JAMMER INVESTIGATIONS. VOLUME 2. MECHANICAL DEVELOPMENT.•
AD-443 097

•RECTIFIERS
DEVELOPMENT OF A HIGH CURRENT, HIGH VOLTAGE SILICON CONTROLLED RECTIFIER.
AD-289 291

•RELIABILITY(ELECTRONICS)
CORROSION INHIBITION
CORROSION PREVENTION/DETERIORATION CONTROL IN ELECTRONIC COMPONENTS AND ASSEMBLIES.•
AD-815 470

•RESISTORS
DESIGN
RESISTORS FOR MICROPOWER CIRCUITS.•
AD-409 906

•RUBY
CRYSTAL GROWTH AND CRYSTALLOGRAPHY. A LITERATURE SURVEY.
AD-274 642

•SEDIMENTARY ROCK
STRUCTURAL PROPERTIES
THE EFFECT OF FLUIDS AND CYCLIC LOADING ON THE ELASTIC CONSTANTS OF ROCKS.•
AD-729 680

•SEMICONDUCTOR DEVICES
ENCAPSULATION
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.•
AD-838 791

MICRO NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.•
AD-846 071

•SEMIPERMEABILITY
A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID ROCKET FUEL.•
AD-265 895

•SILICON
POWER AMPLIFIERS
TRANSISTOR, VHF, SILICON, POWER, LINEAR, 30-MHZ, 100 WATTS (EP.•
AD-604 551

•SODIUM CHLORIDE
ENCAPSULATION
MICROENCAPSULATED CLOUD SEEDING MATERIALS.•
AD-722 448

•SPECIFICATIONS
PROCESSING
PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT.•
AD-423 654

•SPINELS
CRYSTAL GROWTH AND CRYSTALLOGRAPHY. A LITERATURE SURVEY.
AD-274 642

•STEEL
RADIATION DAMAGE
TECHNIQUES AND DESIGN PHILOSOPHY FOR ENCAPSULATION OF TEST SPECIMENS FOR STUDIES OF RADIATION DAMAGE OF STEEL. (NUCLEAR REACTOR STRUCTURAL MATERIAL).
AD-430 751

•STRAIN GAGES
STEAM
ENCAPSULATED STRAIN GAGE INSTALLATION FOR USE IN STEAM ENVIRONMENT.
AD-432 229

•STYRENE PLASTICS

AD-625 956

•ULTRASONIC RADIATION
WELDING
ULTRASONIC WELDING APPLICATION FOR HERMETICALLY SEALING PROPELLANT CONTAINERS.
AD-427 412

•UREA
ENCAPSULATION
MICROENCAPSULATED CLOUD SEEDING MATERIALS.•
AD-722 448

•VAPORS
A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID ROCKET FUEL•
AD-265 895

•VERY HIGH FREQUENCY
TRANSISTORS
TRANSISTOR, VHF, SILICON, POWER, LINEAR, 30-MHZ, 100 WATTS PEP.•
AD-804 551

•VIRUSES
ENCAPSULATION
ENCAPSULATION OF VIRUSES.
AD-620 993

•WELDING
PROPELLANT TANKS
ULTRASONIC WELDING APPLICATION FOR HERMETICALLY SEALING PROPELLANT CONTAINERS.
AD-427 412

TITLE INDEX

RESEARCH.(U)
•AVALANCHE DIODES

MICRO-NOTES. AD-671 797
INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.(U)
•NAVAL EQUIPMENT

MICRO-NOTES. AD-690 445
INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.(U)
•NAVAL EQUIPMENT

MICRO-NOTES. AD-715 108
INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.(U)
•MICROMINIATURIZATION(ELECTRONICS)

MICRO-NOTES. AD-838 791
INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.(U)
•NAVAL EQUIPMENT

MICRO NOTES. AD-846 071
INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.(U)
•NAVAL EQUIPMENT

MINIATURE THIN FILM AD-602 270
INDUCTORS (MODIFICATION NO. 2).(U)
•MINIATURE ELECTRONIC EQUIPMENT

NONCOMMUNICATIONS AD-443 097
EXPENDABLE JAMMER INVESTIGATIONS. VOLUME 2. MECHANICAL DEVELOPMENT.(U)
•RADIO JAMMING

OPTIMIZATION OF AD-265 461
THERMOELECTRIC ENERGY CONVERTERS(U)
•ELECTRIC POWER PRODUCTION

OPTIMIZATION OF AD-265 857
THERMOELECTRIC ENERGY CONVERTERS(U)
•ELECTRIC POWER PRODUCTION

PACKAGED CIRCUITS. AD-704 925
VOLUME I.(U)
•PACKAGED CIRCUITS

PEM FOR TRANSISTOR AD-286 907
MANUFACTURING PROCESS IMPROVEMENT(U)
•TRANSISTORS)

PEM FOR TRANSISTOR AD-433 654
MANUFACTURING PROCESS IMPROVEMENT.(U)
•TRANSISTORS

PRELIMINARY AD-660 249
INVESTIGATION OF PLASTIC ENCAPSULATED TRANSISTORS.(U)
•TRANSISTORS

PREPARATION OF AD-729 691
CAPSULES.(U)
•ENCAPSULATION

PRODUCTION ENGINEERING AD-602 939
MEASURES TO INCREASE TRANSISTOR RELIABILITY FOR THE 2N656.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-604 196
MEASURE FOR THE IMPROVEMENT OF GERMANIUM ALLOY POWER TRANSISTORS.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-435 114
MEASURE ON 2N1708 SILICON PLANAR EPITAXIAL TRANSISTOR. VOLUME I.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-294 110
MEASURE RELIABILITY THRU PROCESS IMPROVEMENT(U)
•MANUFACTURING METHODS

RELIABILITY ANALYSIS OF AD-625 956
X-BAND TUNNEL DIODES.(U)
•TUNNEL DIODES

RELIABILITY EVALUATION AD-707 292
OF PLASTIC INTEGRATED CIRCUITS.(U)
•INTEGRATED CIRCUITS

RELIABILITY EVALUATION AD-722 043
OF PLASTIC INTEGRATED CIRCUITS.(U)
•INTEGRATED CIRCUITS

RESEARCH AND DEVELOPMENT LOW COST INTEGRATED CIRCUIT TECHNIQUES.(U) AD-628 618
•INTEGRATED CIRCUITS

RESEARCH AND DEVELOPMENT OF THERMOCOUPLE ENERGY CONVERTERS(U) AD-291 489
•ENCAPSULATION

RESEARCH STUDIES ON THE DISSEMINATION OF SOLID AND LIQUID AGENTS.(U) AD-827 272
•CHEMICAL WARFARE AGENTS

RESISTORS FOR MICROPOWER CIRCUITS.(U) AD-489 906
•RESISTORS

RHEOLOGY OF ROD-LIKE PARTICLES IN VISCOUS MEDIA. PART I. FORMATION OF COMPOSITES FROM SINGLE FIBERS.(U) AD-849 289
•COMPOSITE MATERIALS

STRESS ANALYSIS OF ENCAPSULATION MATERIALS FOR WELDED MODULES.(U) AD-628 833
•MODULES(ELECTRONIC)

STRESS INDUCED INTERMITTENT FAILURES IN ENCAPSULATED MICROCIRCUITS.(U) AD-719 984
•INTEGRATED CIRCUITS

A STUDY IN TERMINAL BENDING OF UNIFORM AND ENCAPSULATED WIRE ROPE WITH LINEAR AND NON-LINEAR CONSTITUTIVE EQUATIONS.(U) AD-718 336
•CABLES(MECHANICAL)

A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID ROCKET FUEL(U) AD-265 894
•AMIDES

A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID ROCKET FUEL(U) AD-265 895
•ENCAPSULATION

A STUDY OF THE ENCAPSULATION OF HIGH ENERGY SUBSTANCES.(U) AD-601 772
•LIQUID ROCKET PROPELLANTS

THERMAL ANALYSIS. ADVANCED AUTOPILOT FLATPAK MODULE DESIGN RECOMMENDATIONS.(U) AD-722 405
•MODULES(ELECTRONICS)

TRANSISTOR, VHF, SILICON, POWER, LINEAR, 30-MHZ, 100 WATTS PEP.(U) AD-804 991
•TRANSISTORS

VACUUM DE-GASSING OF ENCAPSULANTS. (U) AD-412 282
•ENCAPSULATION

PERSONAL AUTHOR INDEX

*CHIEN, F

* * *

PRODUCTION ENGINEERING MEASURE RELIABILITY THRU PROCESS IMPROVEMENT
AD-294 110

*CICCOLELLA, D. F.

* * *

MICROWAVE DIODE RESEARCH.
AD-821 915

* * *

MICROWAVE DIODE RESEARCH.
AD-822 016

*COOK, JAMES P.

* * *

RELIABILITY EVALUATION OF PLASTIC INTEGRATED CIRCUITS.
AD-722 043

*DAVIS, CHARLES

* * *

RELIABILITY ANALYSIS OF X-BAND TUNNEL DIODES.
AD-625 956

*DAVIS, TERRY R.

* * *

DEVELOPMENT OF MULTIPURPOSE CAPSULAR ADHESIVE SYSTEMS.
AD-730 908

*DEFELICE, A.

* * *

VACUUM DE-GASSING OF ENCAPSULANTS,
AD-412 282

*DE LOACH, B. C., JR

* * *

MICROWAVE DIODE RESEARCH.
AD-82[illegible] 915

*DODSON, G.A

* * *

ENGINEERING SERVICES ON TRANSISTORS
AD-261 938

*ENGELHARDT, F. J. O.

* * *

LOW-LOSS STYRENE-TYPE FOAM-IN-PLACE ENCAPSULATING RESINS,
AD-628 5[illegible]7

*EVANS, F. C.

* * *

THE IMPROVEMENT OF ENCAPSULATING FOAMS AND QUALITY ASSURANCE OF POTTING PLASTIC.
AD-646 915

*EVERETT, PATRICK N.

* * *

LEAD ATTACHMENT AND ENCAPSULATION TECHNIQUES FOR THIN FILM MICROCIRCUITS,
AD-611 752

*EVERSON, THOMAS

* * *

DEVELOPMENT OF A STABLE LEAVENING SYSTEM FOR BAKERY MIXES.
AD-727 680

*FIRTH, MILTON

* * *

NONCOMMUNICATIONS EXPENDABLE JAMMER INVESTIGATIONS. VOLUME 3. MECHANICAL DEVELOPMENT,
AD-443 097

*GIBBONS, G.

* * *

MICROWAVE DIODE RESEARCH.
AD-822 016

*GIBSON, R. W.

* * *

MICROENCAPSULATION.
AD-823 785

*GLEASON, F. R.

* * *

MINIATURE THIN FILM INDUCTORS (MODIFICATION NO. 2).
AD-602 270

*GRANGER, G. F.

* * *

PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON PLANAR EPITAXIAL TRANSISTOR. VOLUME I.

AD-435 114

*HABERER, JOHN R.

* * *

STRESS INDUCED INTERMITTENT FAILURES IN ENCAPSULATED MICROCIRCUITS.
AD-715 984

*HALL, J. E.

* * *

THERMAL ANALYSIS. ADVANCED AUTOPILOT FLATPAK MODULE DESIGN RECOMMENDATIONS.
AD-722 405

*HAWTHORNE, J. R.

* * *

ENCAPSULATION TECHNIQUES FOR NRL IRRADIATION EFFECTS STUDIES.
AD-430 751

*HILBELINK, RONALD D.

* * *

DEVELOPMENT OF MULTIPURPOSE CAPSULAR ADHESIVE SYSTEMS.
AD-730 908

*HSIEH, PAUL Y

* * *

A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID ROCKET FUEL
AD-265 894

* * *

A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID ROCKET FUEL
AD-265 895

*INGLE, L. V.

* * *

RELIABILITY EVALUATION OF PLASTIC INTEGRATED CIRCUITS.
AD-722 043

*KAPFER, VINCENT C.

* * *

FAILURE MECHANISMS IN PLASTIC ENCAPSULATED MICROCIRCUITS.
AD-689 224

*KELLEY, LUCILLE T.

* * *

PRODUCTION ENGINEERING MEASURE FOR THE IMPROVEMENT OF GERMANIUM ALLOY POWER TRANSISTORS.
AD-604 196

*KELLEY, NANCY

* * *

DEVELOPMENT OF A STABLE LEAVENING SYSTEM FOR BAKERY MIXES.
AD-727 680

*KLEIN, PHILIPP H

* * *

OPTIMIZATION OF THERMOELECTRIC ENERGY CONVERTERS
AD-265 461

*KREBS, W. H.

* * *

LOW PRESSURE ELECTRICAL DISCHARGE STUDIES.
AD-605 984

*LA MORI, PHILLIP N.

* * *

THE EFFECT OF FLUIDS AND CYCLIC LOADING ON THE ELASTIC CONSTANTS OF ROCKS.
AD-729 680

*LINDEN, ERIK G

* * *

ENCAPSULATING RESINS AND POTTING COMPOUNDS
AD-096 112

*LITTLE, DAVID R.

* * *

RELIABILITY EVALUATION OF PLASTIC INTEGRATED CIRCUITS.
AD-703 292

* * *

RELIABILITY EVALUATION OF PLASTIC INTEGRATED CIRCUITS.
AD-722 043

*LLOYD, H.E

* * *

INDUSTRIAL PREPAREDNESS STUDY. LACQUER FILM CAPACITORS

AD-257 829

*LOCONTE, JEREMIAH A.

* * *

PRODUCTION ENGINEERING MEASURE FOR THE IMPROVEMENT OF GERMANIUM ALLOY POWER TRANSISTORS.
AD-604 196

*LUECK, ARTHUR

* * *

RELIABILITY ANALYSIS OF X-BAND TUNNEL DIODES.
AD-625 956

*LUFT, L.

* * *

OPTIMIZATION OF THERMOELECTRIC ENERGY CONVERTERS
AD-265 857

*MALINOWSKI, GREGORY J.

* * *

1.5-KW SOLID-STATE POWER CYCLER.
AD-726 018

*MARINACCIO, L. P.

* * *

MICROWAVE DIODE RESEARCH.
AD-821 915

*MCCARTHY, J.P

* * *

DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS
AD-258 395

* * *

DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS
AD-265 499

* * *

DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC COMPONENTS
AD-266 161

*MCMAHON, WILLIAM E

* * *

ENCAPSULATION OF FOODS
AD-284 005

*METCALF, H.F

* * *

EFFECT OF PROCESS VARIABLES ON THE DIMENSIONS AND QUALITY OF EXTRUSION-COATED PROPELLANT GRAINS
AD-255 962

*MISAWA, T.

* * *

MICROWAVE DIODE RESEARCH.
AD-821 915

*MOLZON, ARNOLD E.

* * *

ENCAPSULATION OF ELECTRONIC PARTS IN PLASTICS: A REVIEW,
A. 648 420

*NAKIM, E. B.

* * *

PRELIMINARY INVESTIGATION OF PLASTIC ENCAPSULATED TRANSISTORS.
AD-660 349

*OWENS, GEORGE E

* * *

ENCAPSULATING, POTTING, AND EMBEDDING MATERIALS FOR ELECTRONIC COMPONENTS AND MODULES. AN ANNOTATED BIBLIOGRAPHY
AD-265 866

*PARKS, CHARLES F.

* * *

RESISTORS FOR MICROPOWER CIRCUITS.
AD-489 906

*PETERS, GAVIN H.

* * *

DEVELOPMENT OF MULTIPURPOSE CAPSULAR ADHESIVE SYSTEMS.
AD-730 908

*PETROPOULOS, CONSTANTINE C.

* * *

A STUDY OF THE ENCAPSULATION OF

HIGH ENERGY SUBSTANCES.
AD-601 772

*PIERCE, CHARLIE M
* * *
INSPECTING AND TESTING OF EMBEDDING MATERIALS AND COMPONENTS OF ELECTRICAL MODULES BEFORE, DURING AND AFTER ASSEMBLY: A PARTIALLY ANNOTATED BIBLIOGRAPHY
AD-296 356

*POPPOFF, I. G.
* * *
RESEARCH STUDIES ON THE DISSEMINATION OF SOLID AND LIQUID AGENTS.
AD-827 272

*POSSEMATO, L. R.
* * *
PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON PLANAR EPITAXIAL TRANSISTOR. VOLUME I.
AD-435 114

*RADDING, S. B.
* * *
MICROENCAPSULATION.
AD-823 785

*REED, A. C.
* * *
LOW PRESSURE ELECTRICAL DISCHARGE STUDIES,
AD-605 984

*REICHHOLD, RALPH
* * *
NONCOMMUNICATIONS EXPENDABLE JAMMER INVESTIGATIONS. VOLUME 3. MECHANICAL DEVELOPMENT,
AD-443 097

*ROBBINS, ROBERT C
* * *
ENCAPSULATED AEROSOLS
AD-255 010
* * *
ENCAPSULATED AEROSOLS
AD-260 926
* * *
ENCAPSULATED AEROSOLS
AD-265 314
* * *
ENCAPSULATED AEROSOLS
AD-283 325

*ROGERS, MILTON
* * *
ANALOG COMPUTER RESEARCH INTO THE ENERGY-EXCHANGE BETWEEN GASES AND SOLIDS.
AD-605 159

*ROSENZWEIG, R.
* * *
TRANSISTOR, VHF, SILICON, POWER, LINEAR, 30-MHZ, 100 WATTS PEP.
AD-804 551

*RULISON, R. L.
* * *
MICROWAVE DIODE RESEARCH.
AD-822 016

*SANDERS, J
* * *
PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT
AD-286 907

*SANDERS, J. G.
* * *
PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT.
AD-433 654

*SCARLETT, ROBERT M.
* * *
FOUR-LAYER DIODE DEVELOPMENT PROGRAM.
AD-669 850

*SCHAAB, CARL K.
* * *
DEVELOPMENT OF MULTIPURPOSE CAPSULAR ADHESIVE SYSTEMS.
AD-730 908

*SCHUETZE, CLARKE E
* * *

ENCAPSULATION OF FOODS
AD-284 005

*SILBERMAN, LOUIS

* * *

ENCAPSULATING PROPELLANTS BY MEANS OF ULTRASONIC WELDING.
AD-427 412

*SIRINE, G. F.

* * *

MICROENCAPSULATION.
AD-823 785

*SMITH, K. D.

* * *

MICROWAVE DIODE RESEARCH.
AD-821 915

*SMITH, M. H.

* * *

STRESS ANALYSIS OF ENCAPSULATION MATERIALS FOR WELDED MODULES.
AD-628 833

*SPARLING, R. H.

* * *

CORROSION PREVENTION/DETERIORATION CONTROL IN ELECTRONIC COMPONENTS AND ASSEMBLIES.
AD-815 470

*STEELE, L. E.

* * *

ENCAPSULATION TECHNIQUES FOR NRL IRRADIATION EFFECTS STUDIES.
AD-430 751

*SUTHERLAND, RODNEY

* * *

EFFECT OF PROCESS VARIABLES ON THE DIMENSIONS AND QUALITY OF EXTRUSION-COATED PROPELLANT GRAINS
AD-255 962

*TAKANO, MASAHARU

* * *

RHEOLOGY OF ROD-LIKE PARTICLES IN VISCOUS MEDIA. PART I. FORMATION OF COMPOSITES FROM SINGLE FIBERS.
AD-849 285

*TAMBURRINO, ALFRED L.

* * *

FAILURE MECHANISMS IN PLASTIC ENCAPSULATED MICROCIRCUITS.
AD-689 224

*THUMAN, W. C.

* * *

RESEARCH STUDIES ON THE DISSEMINATION OF SOLID AND LIQUID AGENTS.
AD-827 272

*TOBIN, JOHN F.

* * *

EFFECT OF WATER ABSORPTION ON DIMENSIONAL STABILITY OF ELECTRIC MOTOR ENCAPSULATING MATERIALS.
AD-630 566

*TOLOTTA, S.

* * *

EVALUATION OF HIGH TEMPERATURE INSTRUMENTATION FOR DYNAMIC ANALYSIS. ENCAPSULATED STRAIN GAGE INSTALLATION FOR USE IN STEAM ENVIRONMENT.
AD-432 229

*UMINA, ANTHONY

* * *

DEVELOPMENT OF A STABLE LEAVENING SYSTEM FOR BAKERY MIXES.
AD-727 680

*VALLES, A. C.

* * *

INVESTIGATION OF PLASTIC EFFECTS ON SEMICONDUCTOR RELIABILITY.
AD-854 306

*WAGNER, STURGER

* * *

LOW COST INTEGRATED CIRCUIT TECHNIQUES.
AD-631 491

* * *

LOW COST INTEGRATED CIRCUIT TECHNIQUES.
AD-635 183

*WAGNER, S.

* * *

RESEARCH AND DEVELOPMENT LOW COST INTEGRATED CIRCUIT TECHNIQUES.
AD-628 618

*WALKER, MAURO

* * *

LOW COST INTEGRATED CIRCUIT TECHNIQUES.
AD-631 491

* * *

LOW COST INTEGRATED CIRCUIT TECHNIQUES.
AD-635 183

*WALKER, M.

* * *

RESEARCH AND DEVELOPMENT LOW COST INTEGRATED CIRCUIT TECHNIQUES.
AD-628 618

*WESTCOTT, DONALD E.

* * *

DEVELOPMENT OF A STABLE LEAVENING SYSTEM FOR BAKERY MIXES.
AD-727 680

*WINCKLER, G. A. F.

* * *

THE IMPROVEMENT OF ENCAPSULATING FOAMS AND QUALITY ASSURANCE OF POTTING PLASTIC.
AD-646 915

*ZGLENICKI, CHARLES

* * *

ENCAPSULATING PROPELLANTS BY MEANS OF ULTRASONIC WELDING.
AD-427 412

UNCLASSIFIED

Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY *(Corporate author)*
DEFENSE DOCUMENTATION CENTER
Cameron Station
Alexandria, Virginia 22314

2a. REPORT SECURITY CLASSIFICATION
UNCLASSIFIED

2b. GROUP

3. REPORT TITLE

ENCAPSULATION

4. DESCRIPTIVE NOTES *(Type of report and inclusive dates)*
Bibliography (October 1955 - September 1971)

5. AUTHOR(S) *(First name, middle initial, last name)*

6. REPORT DATE	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
May 1972	114	77

8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S)
b. PROJECT NO	DDC-TAS-72-19-I
	9b. OTHER REPORT NO(S) *(Any other numbers that may be assigned this report)* AD- 740 990

10. DISTRIBUTION STATEMENT

Approved for public release; distribution unlimited

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY

13. ABSTRACT

Encapsulation used as a protective covering for electronic circuits, insulation from moisture and heat, and lacquer film and thin film coatings of capacitors, is the subject of this bibliography. References dealing with failures, cracks, and deterioration effects are amply represented.

Corporate Author-Monitoring Agency, Subject, Title, and Personal Author Indexes are included.

DD FORM 1 NOV 68 1473

UNCLASSIFIED

Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
*Bibliographies						
*Encapsulation						
Embedding Substances						
Transistors						
Manufacturing Methods						
Films						
Aerosols						
Lacquer Films						
Coatings						
Electronic Equipment						
Integrated Circuits						
Mica						
Microminiaturization(Electronics)						
Naval Equipment						
Packaged Circuits						
Packaging						
Dielectrics						